22nd Annual Conference of the Physiological Society of India (PSI)

&

2nd Biennial Conference of South Asian Association of Physiologists (SAAP)

Rediscovering Physiology in the Post-Genomic Era

15th to 17th December 2010

Venue : St. John's Auditorium

Organised by

Department of Physiology

St. John's Medical College

Bangalore - 560034

Karnataka, India

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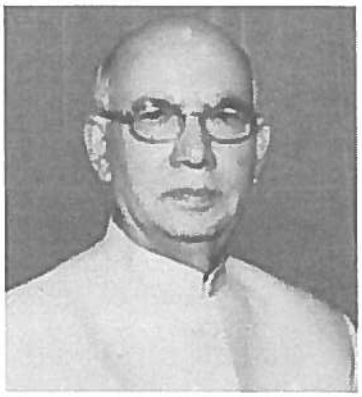
Messages

GOVERNOR
KARNATAKA



RAJ BHAVAN
BANGALORE

No. GS 134 MSG 2010.
November 9th, 2010

MESSAGE

I am delighted to know that St. John's Medical College, Bangalore, is hosting the 22nd Annual Conference of the Physiological Society of India and the 2nd Conference of the South Asian Association of Physiologists between 15th and 17th December, 2010.

I am happy to note that the theme of the Conference is "Rediscovering Physiology in the Post Genomic Era", and the College is doing good service to the mankind in mitigating the health problems.

On this auspicious occasion, I take this opportunity to congratulate the Organising Committee, its functionaries, Staff and Students of the St. John's Medical College, Bangalore.

May the Lord continue to bless this Institution to grow more and more in the years to come.

(BHARDWAJ)

Rajiv Gandhi University of Health Sciences, Karnataka
ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ

Dr. S. Ramananda Shetty M.D.S.,
Vice-Chancellor

N0. PS/70/2010-11

11.11.2010

MESSAGE

I leamt that St John's Medical College is hosting the 22nd Annual conference of the Physiological Society of India and 2nd conference of the South Asian Association of Physiologists between 15th and 17th December 2010, a week ahead of Jesus birth day that happens to be the feast in all its right mind of the word "FEAST" both for eyes, ears and mind. The theme "Rediscovering Physiology in the Post Genomic Era". The conference surely proves to be good intellectual exercise at the right time and the right place.

Human genome raised speculations about the practical utility of this knew knowledge. In such circumstances, I am sure, St John's Medical College Bangalore; the powerful knowledge Institution by itself has organized the conferences for deliberations that in turn certainly help in further advancement of knowledge expertise in the said field. What a unique gathering of scientists and students from across the country in India and neighboring countries. Bangalore will never look at such gathering the same way again unless the scientific society renews and revives.

What is more the department of physiology at St John's Medical College has been at the forefront of research specifically targeting areas of concern in developing countries. Still experts invited to deliberate may launch a hit, overwhelm the new to the field, and serve as additional input to the experienced experts. It would be wonderful hale and energetic ambience at St John's Medical College in Bangalore in the month of December. I am immensely pleased to convey my heartfelt appreciation for the Organizers of this conference and wish the Conference great success. I wish the message be read aloud on the occasion.

Dr.S.RAMANANDA SHETTY

ST. JOHN'S NATIONAL ACADEMY OF HEALTH SCIENCES

St. John's Medical College
St. John's Medical College Hospital
St. John's College of Nursing
St. John's Research Institute
St. John's Institute of Health Management & Paramedical Studies

Rev. Dr. Lawrence D'Souza
BSc, MA (Philo), LLB, MA (Re Studies), PhD (USA)
DIRECTOR

MESSAGE

I am very happy to learn that the 22nd Annual Conference of the Physiological Society of India and the 2nd Conference of the South Asian Association of Physiologists will be held at St. John's Medical College from 15th to 17th December 2010. I congratulate the department of Physiology and wish Dr.Sandhya and her team success in their efforts to make this Conference effective and fruitful.

I understand that this Conference will bring together Scientists and Students from across India and abroad both as participants and resource persons. I extend a warm welcome to each and everyone of them to St. John's.

The theme of the Conference – "Rediscovering Physiology in the Post Genomic Era" – is very appropriate and relevant. I am sure there will be scholarly discussions, exchange of ideas and sharing of the knowledge on the various aspects of this theme. May this Conference help the participants find answers to the questions and concerns raised by the discovery of the human genome.

Rev Dr Lawrence D'Souza
Director

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MESSAGE BY DEAN

I am happy to welcome all delegates to the 22nd Annual Conference of the Physiological Society of India (PSI) and 2nd Biennial Conference of South Asian Association of Physiologists to St. John's Medical College. An important part of the function of any academic Profession is the sharing of knowledge with colleagues from all over the world. This conference is going to do just that and will especially lead to development of partnerships and expertise in Indian and our neighbours which share common bonds culturally, economically and in the fields of education and health, thus making this conference especially relevant.

We in St. John's are happy to host the conference. I wish all delegates a fruitful and enjoyable conference and stay in Bangalore.

Dr. Prem Pais
Dean
St. John's Medical College

ST. JOHN'S MEDICAL COLLEGE

BANGALORE - 560 034.

FROM THE ORGANISING SECRETARY

It is my pleasure to welcome each and everyone present here from various parts of India, from South East Asian countries, UK, and US, to this beautiful garden city and in particular to our Institution, which will be celebrating its Golden Jubilee in the next 3 years.

I am fortunate that I was given the opportunity by executives of the Physiological Society of India and the South Asian Association of Physiologists to host this unique joint conference. The thought to hold the conference began almost a year and a half back with the consensus of the colleagues in the department. Once it was agreed upon each and every member has been toiling hard to make this conference a success.

Dear friends, it is my duty to acknowledge the strength and encouragement that I have received from our Director, Fr. Lawrence, Associate Director Finance Fr. Glen, Dean Dr. Prem Pais and Associate Director College Fr. Mathew. I would like to make a special mention of a few people like Prof. Shetty, Prof. K N Sharma, Mrs. Dua Sharma, Prof. Amar Chandra, . Prof. Debjani Guha,Prof Shyamal Roy, Prof. Arif, Prof. Savithri, Prof. Aslam, Prof. Noorzahan Begum, whom I have been in constant touch for the past 6 – 8 months, to co-ordinate this mega event.

I welcome all the delegates', senior scientists, faculty member, post graduate students, and undergraduate student who have registered and are participating in all the deliberations for the next three days.

The Theme chosen is 'Rediscovering Physiology in the Postgenomic era'

Early this century the discovery of the Human Genome raised speculations about the practical utility of this new knowledge. Today, we recognize that the discovery has raised innumerable new questions before these uses can be realized. Human physiology which focuses on understanding how the human body functions is an integral part of this process of understanding the functional implications of the human genome; hence the theme of this conference.

Wishing each and every one a pleasant stay and fruitful participation in all aspects during the conference.

I am greatly indebted to the donors, sponsors and advertisers for their open gesture with liberal contribution which is a very essential nucleus for any activity.

Finally, for the success of the conference; the credit goes to every member who has tirelessly worked for it and for any short coming I own it solely.

Sandhya T Avadhany

(Dr. Sandhya T. Avadhany.)

Professor and Head
Department of Physiology
St. John's Medical College, Bangalore - 34

ADDRESS OF THE PRESIDENT
Physiological Society of India (PSI)

I am happy that the Department of Physiology, St. John's Medical College, Bangalore is hosting the 22nd Annual Conference of the Physiological Society of India (PSI) and 2nd Biennial Conference of South Asian Association of Physiologists (SAAP) from 15th – 17th December 2010. The Annual Conference is a much awaited day when the members of the Society get the opportunity of introducing with each other on various subjects of their interests. The PSI Conference provides a forum for different Scientists of different disciplines to meet once in a year and discuss various problems concerning not only "problem" but also "interdisciplinary problems" and "policy matters" concerning overall development of the Society of India. I think it is a proud privilege and honour for the people of Bangalore and St. Johns Medical College that Scientist from India and abroad will gather and exchange latest scientific knowledge for the cause of humanity.

As the President of PSI, I warmly welcome you all for the 22nd Annual Conference of the Physiological Society of India (PSI) and 2nd Biennial Conference of South Asian Association of Physiologists (SAAP) in Bangalore. PSI has completed many glorious years and has made tremendous progress in recent years in both education and research of Biomedical Sciences by sponsoring conferences every year in different centers in India. Through these conferences, the Physiologists and Scientists from allied Sciences from India and International destinations will have the opportunity to exchange information, make friendship, establish scientific co-operations and dissemination of knowledge which has advanced in the field of Physiological and Biomedical Sciences.

The Society has been nourished and nurtured by stalwarts in the field of Physiological and Biomedical Sciences as its office bearers with strong convictions and fundamentals. I hope that this interaction will pave the way for a better future. I wish the delegates to have a highly fruitful and rewarding time at this Annual Conference.

It is my earnest hope that the Organizing Committee with their dedicated team of Professors, Teachers, Staff, Scholars and Students will bring dignity to the XXII session and make a memorable event.

Last, I extend my greetings to the organizer, participants and convey best wishes for the success of this Conference. I wish this venture all success.

Prof. Debjani Guha
President – PSI
Vice President - SAAP

Message by General Secretary
Physiological Society of India

On the occasion to commemorate the 22nd Annual Conference of the Physiological Society of India and 2nd Biennial Conference of South Asian Physiologists (SAAP), it is a great privilege and pride of mine to welcome the Honorable Guests who are on the Dias, the distinguished invitees and the delegates who assembled here from the different parts of the country and abroad from our SAARC countries Bangladesh, Sri Lanka, Nepal, Pakistan, Malaysia and from far west United States, Canada, UK and France in this Conference to discus on the focal theme 'Rediscovering Physiology in the Post Genomic Era' at St. John's Medical College which is one of India's premier medical institution of the country. It is a part of the St. John's National Academy of Health Sciences run by the *Catholic Bishops' Conference of India*. It was established in 1963 and is situated in *Bangalore, India*. I would like to convey my deep appreciation to those eminent Physiologists who founded the Physiological Society of India in the pre-independent undivided India to introduce and promote teaching and research in Physiology as basic science in the colleges, universities and institutes and those who nurtured the Society following the aims and objectives of their predecessors. My deep regard is also to those who nurtured the idea to foster the study and dissemination of knowledge of Physiology particularly in South Asia, to promote scientific exchange and help to establish closer personal and professional contacts among those interested and working in the field of Physiology and to facilitate communication among the member societies of the South Asian countries. I extend my deep regards to all the members of the Organizing Committee of St. John's Medical College, the Members of the National and International Advisory Committees who are directly and indirectly involved to organize this international event successfully following the ideas of founders and predecessors of the Society and SAAP in the light of the modern perspective.

Among the scientific societies of pre-independent India, PSI is one of them. The Society was established on July 13th, 1934 by a number of galaxies in the field of Medical Sciences and Physiology including those in the Department of Physiology, University College of Science and Technology, University of Calcutta. The society is affiliated to FIPS, FAOPS and IUPS.

Since many years the need for a forum and the idea of an Association to link enthusiastic scientists and researchers in the fields of Physiology has been attractive to the people of SAARC Countries. In 2007, the initial idea of establishing a joint forum comprising Physiology societies of various SAARC countries was born. The Founder of the Association Dr. Arif Siddiqui expressed the idea to colleagues through mails, telephones and personal visits to conference in India.

Dr. Mohammad Aslam and Dr. H R Ahmad from Pakistan, Dr. Kusal Das, Dr. Mohammad Fahim, Dr. Shyamal Roy Choudhary and Dr. Amar K Chandra from India, Dr Abdul Majid Diwan, Dr. Noorzahan Begum from Bangladesh and Dr. Savi Wimalsekera and Dr. Sharaine Fernandes from Srilanka were the front-line supporters of the initiative and consented to transform the founding group into an Adhoc Steering Committee to pursue the objectives, further.

Afterwards in December, 2007, Dr. Arif Siddiqui was invited at the Annual Conference of the Physiological Society of India, in Faridabad, India. A special meeting was called by Dr. Gulshan Khanna, the Organizing Secretary of XIX th PSI Annual Conference and was attended by the senior physiologists from different universities / medical colleges in India, Bangladesh and Pakistan.

The meeting consented to move forward with the establishment of SAAP and Dr. Arif Siddiqui, Pakistan was given the mandate to approach all the physiology societies of the south Asian Countries and establish the consensus on broader level. An Adhoc Steering Committee was then formed with Dr. Arif Siddiqui in Chair and was charged to draft the Association's by-laws and other members were also asked to send their suggestions within one month to Dr. Siddiqui. After exchanges of feedback and input, the draft document took the shape in January, 2008. Meanwhile, it was agreed at the Adhoc Steering Committee that the first Conference of SAAP be held from Nov 14-16, 2008 at Shifa College of Medicine, Islamabad in conjunction with 11th Biennial Conference of Pakistan Physiological Society. Dr. Nasir Afzal was the organizer of the two Conferences. Over 400 participated from all across from Pakistan, with 16 from India, Bangladesh, Sri Lanka, Iran and Bulgaria. Thus, the SAAP was founded based on the higher enthusiasm of the founders and their wish to promote the knowledge of Physiology. Meeting of the first General Assembly of SAAP was held on November 15th, 2008 and also elected the first Executive Council as per by-laws of SAAP. Accordingly Assembly elected Prof. Muhammad Aslam, Principal Shifa College of Medicine, Islamabad as its first President and Prof. Arif Siddiqui, Executive Director, Academic Planning, National Institute of Health & Social Sciences, Islamabad as its first Secretary General besides other officials. The Association began its executive activities. SAAP is now organizing its Second Conference from December 14-16, 2010 at St John's College, Bangalore, India with Dr. Sandhya Avadhany as the Chair Organizing Committee.

The PSI is now one of the integral bodies of SAAP. Since its inception the society has been acting as a strong platform in the country to fulfill its ambition by advocating its need in the promotion of human welfare in the society. The importance of physiology has been well established in the field of Nutrition & Dietetics, Endocrine & Reproductive Research, Neurophysiology, Biotechnology, High Altitude & Desert Physiology, Toxicology & Drug Development, Ergonomics & Work Environment, Sports & Exercise Physiology, Electrophysiology, Cardiovascular Physiology, Immunology & Microbiology including Proteomics, Genomics & Neutromics. Being the originator rather integrator, its overall expansion is needed because physiology is the root and it provides the nutrient to all branches of modern biology. Without its development the outcome of the research from other branches will remain unutilized. Thus, it is the time wherein lies the importance-of the society with its strong commitment to establish the importance of the subject. To achieve this goal, collaborations between the physiologists from Medical Sciences and those from Non-Medical Physiology is needed.

Today is the day where we gather to fulfill the commitments of our founders.

In this respect I must emphasize on this occasion that Physiology has now become multidisciplinary subject and needs extensive nurturing and researches starting from cellular and molecular physiology to consequent integration of human body functions. This linking with meaningful outcome in relation to human welfare and alleviation of human sufferings from various diseases malnutrition, environmental toxicants, occupational health hazards, biological nuclear warfare, will be possible if the subject of physiology is taught and researched extensively as a basic science in more and more number of universities of our country and the SAARC Countries. In this respect I seek the cooperation of the distinguished delegates and other personalities who have gathered here to discuss on the very focal theme 'Rediscovering Physiology in the Post – Genomic Era'.

We are honored by the presence of eminent delegates from the country and abroad. Last but not the least I also thank all media persons for extending help in better coverage and their support

Prof. Amar K Chandra
Endocrinology & Reproductive
Physiology Laboratory, Department of Physiology
University College of Science & Technology, University Kolkota

Message from President
South Asian Association of Physiologists (SAAP)

The South Asian Association for Regional Cooperation (SAARC) is an organization of *South Asian* nations, founded in 1985 and dedicated to economic, technological, social, and cultural development emphasizing collective self-reliance. Its seven founding members are *Bangladesh*, *Bhutan*, ***India***, the *Maldives*, *Nepal*, *Pakistan*, and *Sri Lanka*. *Afghanistan* joined the organization in 2007.

The chartered objectives of the Association include:-

- to promote the welfare of the people of South Asia and to improve their quality of life;
- to accelerate economic growth, social progress and cultural development in the region and to provide all individuals the opportunity to live in dignity and to realize their full potential;
- to promote and strengthen collective self-reliance among the countries of South Asia;
- to contribute to mutual trust, understanding and appreciation of one another's problems;
- to promote active collaboration and mutual assistance in the economic, social, cultural, technical and scientific fields;
- to strengthen cooperation with other developing countries;
- to strengthen cooperation among themselves in international forums on matters of common interest; and
- to cooperate with international and regional organisations with similar aims and purposes.

In order to achieve the above mentioned noble objectives, various organizations, societies, forum and associations were formulated in the branches of engineering, humanities, social sciences, art & culture, information technology, geography, ecology, and so forth. Even the sector of health sciences didn't lag behind. SAARC professional societies got established in the area of cardiology gastroenterology, neurology, endocrinology, chest diseases, surgery neurosurgery, orthopedics, anesthesiology, radiology, dermatology and so on. The basic health sciences (comprising of pre-clinical and para-clinical disciplines) couldn't organize themselves and were not able to contribute much at SAARC level.

Physiology, one of the disciplines of basic health sciences makes the back bone of understanding medicine. Physiology, indeed, is the art to learn homeostasis which is the essence of life for all the living creatures. According to the great scientist "Claude Bernard". In Physiological sciences, the world forum exist as "International Union of Physiology Sciences (IUPS)" and Federation of Asian and Oceanian Physiology Societies (FAOPS). Also, local societies in the SAARC and several member countries are doing their job quite well like Indian Physiological Society, Pakistan Physiological Society, Bangladesh Physiology Society, Sri-Lankan Physiological severely, whereas, Nepalese Physiological Society is in the offing. But no formal forum for Physiological Society at SAARC level existed till 2007. Thus, it was considered appropriate that

Physiologists of South Asia may sit together, do brain storming and make this platform. In 2007, the initial idea of establishing a joint forum comprising Physiology societies of various SAARC countries was born. The Founder of the Association Dr. Arif Siddiqui expressed the idea to colleagues through mails, telephones and personal visits to conference in India. Dr Muhammad Aslam and Dr. HR Ahmad from Pakistan, Dr Kusal Das, Dr Mohammad Fahim, Dr. Amar K Chandra and Dr. Shyamal Roy Choudhary from India, Dr Abdul Majid Diwan, Dr. Noorzahan Begum from Bangladesh and Dr. Savi Wimalsekera and Dr. Sharaine Fernandes from Srilanka were the front-line supporters of the initiative and consented to transform the founding group into an Adhoc Steering Committee to pursue the objective, further.

Afterwards in December, 2007, Dr Arif Siddiqui was invited to annual conference of Physiological Society of India, in Faridabad, India. A special meeting was convened by Dr. Gulshan Khanna, the organizer of PSI's Annual meeting on Dec 07, 2007 and was attended by the senior physiologists from different universities/medical colleges in India, Bangladesh and Pakistan. The meeting consented to move forward with the establishment of South Asian Association of Physiologists [SAAP] and Dr Arif Siddiqui, Pakistan was given the mandate to approach all the physiology societies of the south Asian Countries and establish the consensus on broader level. An Adhoc Steering Committee was then formed with Dr Arif Siddiqui in Chair and was charged to draft the Association's by-laws and other members were also asked to send their suggestions within one month to Dr Siddiqui. After exchanges of feedback and input, the draft document took the shape in Jan, 2008.

Meanwhile, it was agreed at the Adhoc Steering Committee that the first Conference of SAAP be held from Nov 14-16, 2008 at Shifa College of Medicine, Islamabad in conjunction with 11th Biennial Conference of Pakistan Physiological Society. Dr. Nasir Afzal was the organizer of the two Conferences with Dr. Muhammad Aslam as its Organising Secretary. Over 400 participated from all across from Pakistan, with 16 from India, Bangladesh, Sri Lanka, Iran and Bulgaria. Thus, the SAAP was founded based on the higher enthusiasm of the founders and their wish to promote the knowledge of functioning of the human body.

Meeting of the first General Council of SAAP was held on November 16, 2008 and also elected the first Executive Council as per by-laws of SAAP. Accordingly General Council elected Prof Muhammad Aslam, Principal, Shifa College of Medicine, Islamabad as its first President and Prof. Arif Siddiqui, Executive Director, Academic Planning, National Institute of Health & Social Sciences, Islamabad as its first Secretary-General, beside other officials.

The Association began its executive activities such as designing the Association's logo, preparing the membership regulation, establishing the headquarter of the Association in Rawalpindi, now in the process of obtaining an official registration from the City District Courts, preparing a comprehensive directory of the members of constituent societies Dr Wimalsekera deserves special appreciation for taking responsibility of gathering information from constituent societies.

SAAP is now close to organizing its Second Conference from Dec 14-16, 2010 at St. John's College, Bangalore, India with Dr Sandhya Avadhany as the Organizing Secretary. The objects of SAAP include:-

1. To foster the study and dissemination of knowledge of physiology particularly in South Asia.
2. To promote scientific exchange and help establish closer personal and professional contacts among those interested and working in the field of physiology.

3. To facilitate communication between the Member Societies.
4. To organize and hold Regional Conferences every two years (biennial) or at such other times as determined by the General Council and to promote and support such other activities as may be deemed necessary.
5. To facilitate travel and hospitality for conference participants where ever convenient.
6. To cooperate with the IUPS, FAOPS and other international bodies in scientific and educational programmes.

The gigantic task before us is to strengthen our local (native) Physiological Societies and to establish strong linkage and collaboration with SAAP. The linkage could be to learn from each other in curricular development, learning strategies, teaching methodologies, evaluation system and advocacy. Furthermore, we can develop our exchange programmes in students electives or observership, faculty exchanges, guest speakers, thesis evaluations, editorial reviews, external examiner ship, joint conferences, joint research projects and split Ph.D or fellowship programmes, and joint awards. SAAP would be in a position to advocate and advice the accreditation bodies of its member countries to reform and reframe the Physiological Sciences.

By taking these measures, cohesion, cooperation, linkages, collaborations, associations and even mergers would establish. We can have out of box thinking and bring openness and flexibility in our behaviour. We can have innovative vistas of knowledge, skills and attitude making our life easy and easier for others in the region. Moreover, we can jointly pool and mobilize our resources in work force, material and medicine.

Let's not delay and develop a slogan "Think & Link, Share & Care". God bless all Physiologists of the SAARC region and we must remember the miracle of a saying in health sciences "Health, not disease is the greatest of medical science mysteries".

I feel proud of you; we are the strength of South Asia. Without our cooperation, South Asia may be pulseless and breathless.

Maj. Gen. (Trd.) M. Aslam
Principal, Shifa College of Medicine
Islamabad, Pakistan
Phone: +9251460 3795
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Message From Secretary General South Asian Association of Physiologists

It is an established fact that amongst the basic science disciplines physiology is always to play key role in shaping up the medical curriculum which is not a static document and plays a central role in national health care programmes. Its pertinence to the health care needs is important for medical graduates to tackle the changing needs of the society. It is often a repeated criticism that medical colleges in South Asia are producing graduates who are not well equipped to accept the fresh challenges. From time to time various sections of society emphasize the importance of teaching about primary health care, aging, cardiopulmonary resuscitation, alternative and complimentary medicine. The challenging financial, political, consumers and technology trends are regarded as mounting hindrances to scholastic and community-oriented medicine in the South Asia. Although understanding of the basic disciplines of biomedical sciences and provision of state of the art physical facilities are of primary importance for optimal resource utilization, however, in resource-constrained South Asian region this calls for a concerted and integrated approach to face the fresh challenges of charting a global future for education in physiology. The forum like SAAP in collaboration with International Union of Physiological Sciences and Federation of Asian & Oceanian Physiological Sciences has the potential to mobilize the community of physiologist in South Asia to educate them and work in together in proactive manner to devise strategies such as horizontal use of faculty to gear up to the 21st century challenges of research and teaching of physiology.

I have no doubt that SAAP has got to play a pivotal role by providing a platform in bringing community of physiologist in the region on board for making curricular reforms for teaching and research in physiological sciences.

Arif Siddiqui PhD
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Secretary General, South Asian Association of Physiologists
Executive Director, National Institute of Health & Social Sciences
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History of PSL

THE PHYSIOLOGICAL SOCIETY OF INDIA
(Estd. 1934)
Registered under Act XXI of 1860

Brief History about the Society and its Activities

1. Brief History

The Physiological Society of India is the pioneer organization of the Physiologist of India. The Society was established on **July 13, 1934** by a group of eminent persons like **Sir Nilratan Sarkar, Sir Kedar Nath Das, Sir Upendra Nath Brahmachari, Dr. Bidhan Chandra Roy**, who were the well known Physician in Calcutta, along with some renowned Physiologists and Biochemists like **Prof. Subodh Chandra Mahalanobis, Prof. Narendra Mohan Basu, Bijoli Behari Sarkar, Prof. Parimal Bikash Sen, Prof. J. N. Moitra, Prof. D. N. Mullick, Prof. Biresh Chandra Guha** etc.

The **first President** of the Society was **Prof. Subodh Chandra Mhalanobis**, the pioneer Physiologist, who also became the first Professor of Physiology in India under the Science Faculty in the Presidency College in Calcutta, a constituent College of the University of Calcutta.

The **first two Secretaries** of the Society were **Prof. Nibaran Chandra Bhattacharya** and **Prof. Narandra Mohan Basu**. The **first Treasurers** and the **first Assistant Secretary** of the Society were **Prof. Bijoli Behari Sarkar** and **Dr. P. M. Brahmachari** respectively.

The Society first started functioning in Calcutta. But in course of time it became an All India Organization of Physiologists, Pharmacologists, Biochemists and Medical students and teachers.

The Physiological Society of India is registered under Act XXI of 1860. The **office of the Society** is situated in the **Physiology department, University College of Science & Technology**, University of Calcutta, 92 APC Road, Calcutta – 700 009 for more than forty-five years. There are more than 441 life members of the Society now. Some of the internationally reputed Honorary Members of the Society, were **Prof. Sir John Eccles, Nobel Laureate, Prof. D Whitteridge, Prof. Sir A. S. Paintal, Prof. A. V. Hill, Prof. Sacchidananda Banerjee and Prof. Sukhamoy Lahiri,** etc.

The Physiological Society of India is attached to the **International Union** of **Physiological Sciences (IUPS)**. The Society is also a **member society** of **Federation of Asian and Oceanian Physiological Sciences (FAOPS)** and **Federation of Indian Physiological Societies (FIPS)** and newly formed **South Asian Association of Physiologists (SAAP)**. The Society has attained its 75 years on July 13, 2009.

2. Activites

2.1 *Annual Conferences*

The Society has organized conferences, scientific meeting, seminars, invited lectures etc. every year regularly since its inception in 1934. But the Annual Conferences were designated serially from 1989. Accordingly twenty (20) annual conferences have been organized in different places of India since 1989 till date. The first such designated conference was held in the Department of Physiology, Calcutta University in 1989. Not only several symposia or Seminars were organized in those Annual conferences but also several Invited Lectures and Memorial Orations have been delivered by many distinguished speakers from India and abroad. The twenty first Annual conference was held at science City, Kolkata during November 12-14, 2009.

2.2 *Publications*

2.2.1 Indian Journal of Physiology and Allied Sciences

The Society releases regularly its official publication, **Indian Journal of Physiology and Allied Sciences** from **January 1947.** It is a quarterly journal published in the months of **January, April, July and October** of every year.

The first Editors of the journal were **Dr. Narendra Mohan Basu, Prof. Bijoli Behari Sarkar and Dr. Nagendra Nath Das.** The first issue of the journal contained forty-five pages and includes five original papers and an encouraging letter from the renowned scientist **Prof. A. V. Hill**, the then Secretary of the Royal Society of England, UK.

The **Golden Jubilee issue** of the journal was published in 1997 – 98. The issue contained ninety three pages and included ten invited articles from some outstanding scientists and researchers, working in India and abroad, like **Prof. Amiya K Banerjee (USA), Prof. John Widdicombe (UK), Prof. Sukhamoy Lahiri (USA), Dr. Sankar N. Kayal (USA), Prof. T. Ramasarma (India), Prof. P. Astrand** etc.

The ISSN No. of the journal is ISSN 0367-8350. The journal is now published under the Declaration No. 23/74 dated 12.02.1974 and the Registration No. of the journal is S/6781/1965-66 dated August 31, 1965 as issued by the Ministry of Information and Broadcasting, Government of India.

The journal is now indexed in **Ind Med (*http://indmed.nic.in*), though it was indexed elsewhere earlier.**

2.2.2 Laboratory Note Books

The Society has published Laboratory Note Books on Biochemistry, Histology and Experimental Physiology Practical for the Undergraduate Degree Course (Pass/General/Honours) from 1963 onwards. These Laboratory Note Books have been written, revised and updated by the experienced professors, researchers in Physiology and the members of the society. Different universities of West Bengal in India have recommended these Laboratory Note Books for the students of the Under Graduate Courses of the Colleges affiliated to those Universities, where Physiology is taught under the Basic Science Faculty.

2.3 *Oration Lectures*

The Society has instituted **ten (10) Oration Lectures**. The Oration Lectures are delivered in **Annual Conferences, Indian Science Congress Sessions [Physiology/Medical Sciences (Physiology) Section]** or in a special function by the distinguished Physiologists, scientists, researchers of India and abroad.

These **Oration Lectures** are as follows :

i) Prof. S.C. Mahalanobis Memorial Oration

ii) Prof. B.B. Sarkar Memorial Oration

iii) Prof. P.B. Sen Memorial Oration

iv) Prof. S.R. Maitra Memorial Oration

v) Prof. J.N. Moitra Memorial Oration

vi) Prof. A.K. Mukherjee Memorial Oration

vii) Prof. Ramendra Sunder Sinha Memorial Oration

viii) Sm. Subha Mukherjee Memorial Oration

ix) Sm. Shakuntala Das Gupta Memorial Oration

x) Dr. Chitralekha Mukherjee Memorial Oration

2.4 *Young Scientists Award / Prize*

The Society has instituted **four Young Scientists Award / Prize** to encourage the young researchers in Physiology and allied sciences.

The Young Scientists Award / Prize are as follows :

i) Prof. B.B. Sarkar Memorial Research Prize

ii) Prof. P.B. Sen Memorial Research Prize

iii) Dr. Sanjukta Mukhopaddyay Memorial Best Research Paper Award

iv) Prof. Sacchidananda Banerjee Memorial Research Award.

2.5 *Post – Graduate Students Award / Prize*

The Society has instituted **four Post – Graduate Students Award / Prize** to encourage the Post Graduate Students in Physiology and allied sciences.

These **Post – Graduate Students Award / Prize** are as follows:

i) **Prof. S.R. Maitra Memorial Prize** for Post – Graduate Students with **Work Physiology and Ergonomics Special Paper** in Physiology of Calcutta University

ii) **Sm. Shakuntala Das Gupta Memorial Prize** for Post – Graduate Students with **Nutrition Special Paper** in Physiology of Calcutta University

iii) **Prof. A.K. Mukherjee Prize** for Post – Graduate Students with **Biophysics and Electrophysiology Special Paper** in Physiology of Calcutta University

iv) **Dr. D. N. Mullick Research Award**

2.6 Scientific Meeting

Scientific meeting are organized every year by the Society either independently or jointly with other organizations like the Physiology Department, Calcutta University.

2.7 Foundation Day Celebration

The Society was established on July 13, 1934. The Society now celebrates Foundation Day on July 13 or any convenient day in the month of July.

2.8 Others

The Society performs other activities for the advancement of Physiology teaching in Life Science curriculum of secondary schools of West Bengal, affiliated to the Board of Secondary Education, West Bengal and also in biological sciences curriculum of Higher Secondary Schools of West Bengal, affiliated to the council of Higher Secondary Education, West Bengal. The Society also functions for the advancement of research in Basic Science Faculty in West Bengal and other states of India as and when required.

An Important Announcement

From the forthcoming year, 2011, the physiological society of India is introducing Dr. K. Raghothama Rao Oration lecture to honour the physiologists of the country who are actively involved in teaching/research in physiology. The oration lecture is instituted by Dr. Raghothama Rao's under graduate students.

PSI Annual Conferences held in the Past

Sl. No	Year	Venue	Organizing Secretary
I	1989	Calcutta university, Calcutta	Prof. Satipati Chatterjee
II	1990	Midnapore College, Midnapore	Dr. Shyamapada Paul
III	1991	Sports Authority of India, Bangalore	Dr. G. L. Khanna
IV	1992	Kalyani University, Kalyani	Prof. Aloke Banerjee
V	1993	IVRI, Izzatnagar	Dr. B. B. Mahapatra
VI	1994	Viswabharti University, Shantiniketan	Prof. N. C. Sukul
VII	1995	DIPAS, New Delhi	Dr. A. K. Mukherjee
VIII	1996	Vidyasagar University, Midnapore	Dr. Somnath Ray
IX	1997	Burdwan Medical College, Burdwan	Prof. C. R. Maity
X	1998	Benaras Hindu University, Varanasi	Dr. S. B. Deshpande
XI	1999	Delhi University, New Delhi	Prof. M. Fahim
XII	2000	ROHC(E), Calcutta	Dr. A. Roy Chowdhury
XIII	2001-02	Calcutta University, Calcutta	Dr.(Mrs).Debjani Guha
XVI	2002	Serampore College, Serampore, Hoogly	Dr.(Mrs). Asima Das
XV	2003	Al-Ameen Medical College, Bijapur (Karnataka)	Dr. Salim A. Dhundasi
XVI	2004	Raja N. L. Khan Women's College Paschim Midnapore, West Bengal	Dr. Dilip K. Nandi
XVII	2005	M. R. Medical Collge, Gulbarga (Karnataka)	Prof. B. R. Doddamani
XVIII	2006	Presidency College, Kolkata	Prof. Chandan Mitra
XIX	2007	Faridabad Insitute of Technology, Faridabad	Prof. G. L. Khanna
XX	2008	Tripura University, Agartala, Tripura	Prof. A. Deb Roy & Dr. S. K. Sil
XXI	2009	Science City Convention Centre, Kolkata	Prof. Amar K.Chandra

History of SAAP

Brief History of South Asian Association of Physiologists

The "South Asian Association of Physiologists" (SAAP) is formed with the combined efforts of the academicians, researchers and clinicians from all the South Asian Association of Regional Cooperation (SAARC) countries working in diverse sub-specialties of physiology in the year 2008. Its constitution includes the physiology societies of all SAARC countries (where ever exists) that is Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Physiology societies from these countries and individual members from countries where no physiology society exist, will need to apply for membership and be formally accepted in the SAAP. The Association shall be affiliated with the other continental and regional Physiology Associations that are in the Membership of the International Union of Physiological Sciences (IUPS) and Federation of Asia and Oceanian Physiological Societies (FAOPS) and take part in their activities.

Goals and Objectives

The Association is an interdisciplinary scientific organization dedicated to field of physiology from basic research to clinical issues and physiology education in SAARC countries. The Association will be affiliated with other Scientific Federation(s) for accomplishment of its objectives. It will organize and hold Regional Conferences **every two years (biennial)** or at such other times as determined by the General Council and to promote and support such other activities as may be deemed necessary for the realization of the above aims, to foster the study and dissemination of knowledge of physiology particularly in South Asia and to promote scientific exchange and help establish closer personal and professional contacts among those interested and working in the field of physiology.

The first SAAP conference was held in November 2008 at Islamabad, Pakistan along with the Physiological Society of Pakistan. This will be 2nd conference of SAAP in India.

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Acknowledgements

Acknowledgements

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Tourist Places

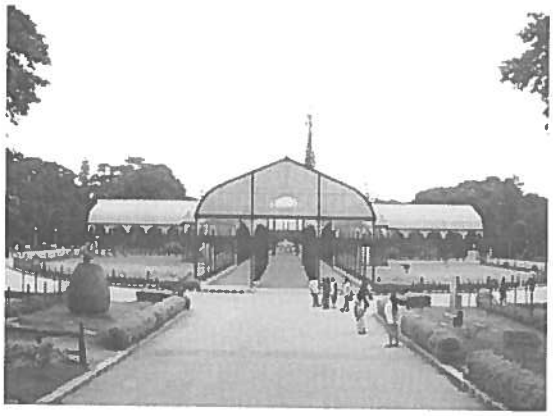
Tourist Spots in Bangalore

Visvesvaraya Industrial and Technological Museum

Visvesvaraya Industrial and Technological Museum is situated on the Kasturba Road in Bangalore. Named after M. Visvesvaraya, the Dewan of Mysore, it comprises of five galleries, namely Popular Science Gallery, Kimbe Paper Metals Gallery, Children's Science Gallery, Electronic Technology Gallery and Engine Hall Gallery. Visvesvaraya Museum is the perfect place to get an idea about the working of different types of machines.

Apart from airplane and steam engine, a number of other items are also on display inside the museum. For example, exhibits on electronics, motor power, uses and properties of wood and metal, etc. If you have an interest in popular science, you can also work on some of the exhibits. A major attraction of the Visvesvaraya Industrial and Technological Museum comprises of its mobile science exhibition.

Lal Bagh

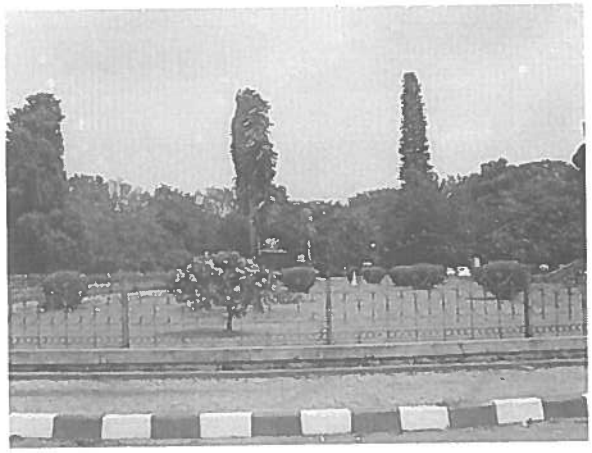


Lal Bagh is a 240 acre (971,000 sq.m. - almost 1 km^2.) garden and is located in south Bangalore. It holds a number of flower shows, especially on the Republic Day (26th January). The garden has over 1,000 species of flora. The garden also has trees that are over 100 years old.

The garden surrounds one of the towers erected by the founder of Bangalore, Kempe Gowda. The park has some rare species of plants brought from Persia, Afghanistan and France. With an intricate watering system for irrigation, this garden is aesthetically designed, with lawns, flowerbeds, lotus pools and fountains. Most of the centuries old trees are labeled for easy identification. The Lal Bagh Rock, one of the oldest rock formations on earth, dating back to 3000 million years, is another attraction that brings the crowds. Lal Bagh remains open daily from 6.00 a.m. to 7.00 p.m. throughout the year.

Cubbon Park

Cubbon Park is a landmark 'lung' area of the Bangalore city. Originally created in 1870, when Major General Richard Sankey was the then British Chief Engineer of Mysore state, it covered an area of 100 acres (0.40 km^2) and subsequent expansion has taken place and the area reported now is about 300 acres



(1.2 km^2). It has a rich recorded history of abundant flora and fauna plantations coupled with numerous impressive and aesthetically located buildings and statues of famous personages, in its precincts. This public park was first named as "Meade's Park" after Sir John Meade, the acting Commissioner of Mysore in 1870 and subsequently renamed as Cubbon Park after the longest serving commissioner of the time, Sir Mark Cubbon. The landscaping in the park creatively integrates natural rock outcrops with thickets of trees, massive bamboos, with grassy expanse and flowerbeds and the monuments within its limits, regulated by the Horticulture Department of the Government of Karnataka. The predominantly green area of the park has many motorable roads, and the well laid out walking paths running through the park are frequented by early morning walkers and the naturalists who study plants in the tranquil natural environment.

The Park is open to the public at all times but the roads are closed for traffic from 5 A.M to 8 A.M every day.

Vidhana Soudha

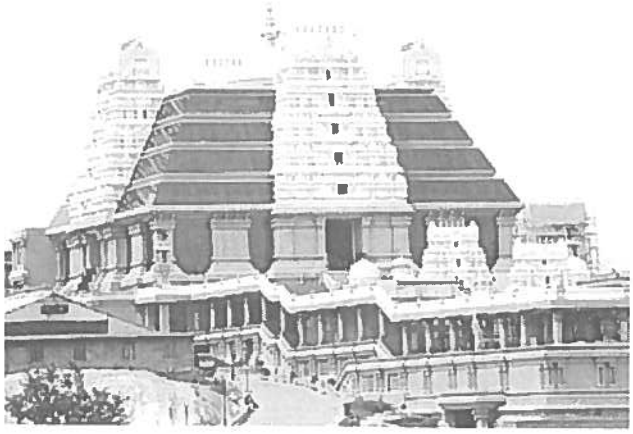
Though Kengal Hanumanthaiah is credited with the conception and construction of the Vidhana Soudha, a building project to house the secretariat and legislature was planned and decided upon by the K. C. Reddy cabinet which was simply called House of Legislature. The foundation was laid by the then Prime Minister of India, Jawaharlal Nehru, on July 13, 1951. However it was Kengal Hanumanthaiah who was instrumental in the redesign and speedy construction of Vidhana Soudha. He visited Europe, Russia, United States and other places and got the idea of building Vidhana Soudha by incorporating various designs from the buildings he had seen. It was completed in 1956. Kengal Hanumanthaiah took a lot of interest and effort in building this marvelous granite building.

The Vidhana Soudha has four floors above and one floor below ground level and sprawls across an area of 700 by 350 feet. It is the largest Legislative building in India. Its eastern face has a porch with 12 granite columns, 40 feet tall. Leading to the foyer is a flight of stairs with 45 steps, more than 200 feet wide. The central dome, 60 feet in diameter, is crowned by a likeness of the Indian national emblem. The front of the building is inscribed with the words Government's Work is God's Work.

The building is illuminated on Sundays and public holidays.

ISKCON Temple

ISKCON as part of International Society for Krishna Consciousness is situated on Chord Road in Bangalore. It is a must visit temple and is built on a hillock with scenic surroundings in 1996. As part of Hare Krishna movement in India, its followers believe that Hindu Lord Krishna is the creator of this world and is the central theme of their movement. Massive pillars, very flamboyant idol for worship, laser shows, living quarters, class rooms, yoga centers, dance studios, gift shops and restaurants signify this place of worship. Akshaya Patra, program where food is distributed free of cost, is sponsored by the temple.



Jama Masjid

Jama Masjid, situated near the City Market, is the most impressive mosque in Bangalore. Designed by Rayyaz Asifuddin of Hyderabad, India, it was built in 1940 with white marble from Rajasthan and is dedicated to Tippu Sultan. This land mark has bulbous domes, twin towers standing on exquisitely carved granite pillars and fashioned jali work in the balcony. It is a five–storied structure, with space to accommodate up to 10,000 devotees. With an ablution pool in the center of mosque, the ambiance inside the mosque is cool, serene and airy. Friday Prayers: 1:20 PM

Infant Jesus Shrine

Designed by architects, Thomas Associates, the church has a a fan shaped hall, to accommodate about 2500 people with 9 faces and openings running all round the church. In addition, there is a mezzanine area and basement parking. The podium is raised above road level with steps and ramp on either side. The interior of the church is so designed that wherever people are seated they will feel that the altar is facing them. The main mural which is 6x9 metres replicates the nativity scene in the nativity church of Jerusalem.

Cauvery Emporium

Cauvery Arts Emporium: For the best in handicrafts from Karnataka head here. This state government owned shop offers you the best in handicrafts from Karnataka. You can pick up an enormous rosewood elephant or statues in sandalwood. Other artifacts include garlands, soap, boxes, all made of sandalwood, and the Lambada jewellery and clothes. The famous wooden toys of Channapatna are fascinating. Simple and colourful they make wonderful gifts for children. Two floors of enchanting goods are worth the visit especially for those who want to take back with them a slice of Karnataka.

There are quite a few malls in Bangalore to enrich your shopping experience. Among the well-known ones are the Forum Mall, the Garuda Mall, Total Mall, etc.

Tourist Spots Away from Bangalore

Nandi Hills

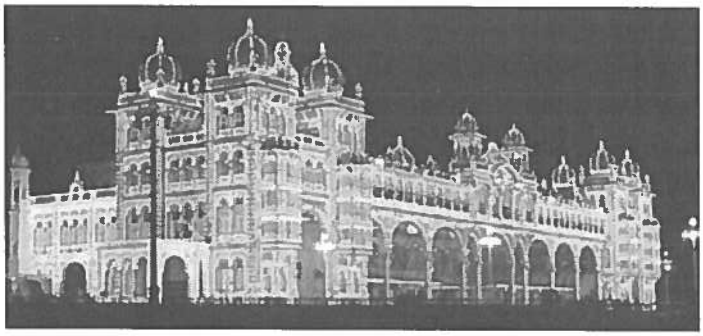
Nandi Hills has been a favourite picnic place for young enthusiasts on a weekend. The pleasant climate appeals to the old and the young alike.

From Bangalore, the capital of Karnataka, Nandi Hills is a mere 60 kilometers. Nandi Hills offers a surprise of breathtaking scenic beauty and excellent climatic condition. Situated in the Chikkaballapur Taluk of Kolar District in Karnataka, Nandi Hills, at the height of 4851 feet above sea level is, the most popular picnic spot.

Mysore

140 Kms from Bangalore lies the abode of untold grandeur and glory. Mysore, the capital city of the Wodeyars has always enchanted its admirers with its quaint charm, rich heritage, magnificent palaces, beautifully laid-out gardens, imposing buildings, broad shady avenues and sacred temples. There's an old world charm about the city that reaches out and leaves no one untouched. Mysore Dasara is the celebration of this victory of good over evil. Mysore also has associations with the Mahabharata and King Ashoka of the 3rd century B.C. During the Wodeyar rule Mysore reached the Zenith of its glory as a fabled centre of oriental splendour.

Mysore is the second largest city of Karnataka. Today, Mysore is a vibrant city teeming with tourists and visitors. It is known world over for its exotic sandalwood and rich silks. Its grand and imposing palaces, majestic temples, gardens leave an ever-lasting impression on the visitor.



Situated 770m above sea level, Mysore has a warm and cool climate throughout the year. Places to visit in Mysore include: Mysore Palace, Brindavan Gardens, Chamundi Hills, St.

Philomena's Church, Mysore Zoo, The Art Gallery, Rail Museum, Karanji Lake Nature Park, Kishkindha Moolika Bonsai Garden

Jog Falls

Jog Falls created by the Sharavathi River falling from a height of 253 meters (829 ft) is the highest plunge waterfall in India Located in Shimoga District of Karnataka state, these segmented falls are a major tourist attraction. It is also called by alternative names of Gerusoppe falls, Gersoppa Falls and Jogada Gundi.

There are many waterfalls in Asia - and also in India - which drop from a higher altitude. But, unlike those falls, Jog Falls is untiered, i.e., it drops directly and does not stream on to rocks. Thus, it can be described as the highest untiered waterfalls in India.

The falls are seen best from selected points of view, the most popular being Watkin's platform. From this side a descent may be made to the pool below, the water in which is 130 feet (40 m) in depth.

Shivana Samudra

The Shivanasamudra Falls is on the Kaveri River after the river has wound its way through the rocks and ravines of the Deccan Plateau and drops off to form waterfalls. The island town of Shivanasamudra divides the river into twin waterfalls. This creates the fourth largest island in the river's course. A group of ancient temples are located here.

This is a segmented waterfall. Segmented waterfalls occur where the water flow is broken into two or more channels before dropping over a cliff, resulting in multiple side by side waterfalls. It has an average width of 849 meters, a height of 90 m, and an average volume of 934 cubic meters / sec. The maximum recorded volume is 18,887 cubic meters / sec. It is a perennial waterfall. The time of best flow are the monsoon season of July to October.

Belur and Halebid

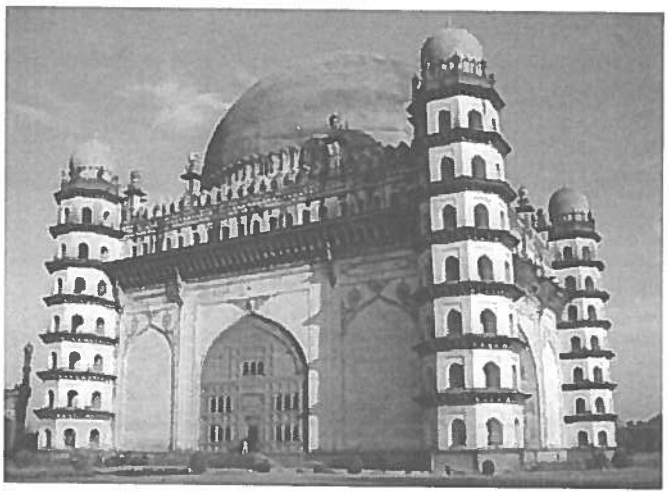
Belur and Halebid are two tiny but beautiful temple towns 16 km apart in the southern state of Karnataka. Once at the centre of a great empire ruled by Hoysalas in the 12th century, Belur and Halebid are heritage

towns and are home to several exquisite temples which reveal the artistry of Indian sculptors and the mastery of the temple builders of yore.

No less exquisite than the famous temples of Khajuraho, the temples of Belur and Halebid will leave you wanting to come back for a second look. The temples of Belur & Halebid are magnificently done up with intricate carvings and fine architecture. One must not miss out on the exquisite Hoyasala architecture which is worth a notice in all the temples.

Gol Gumbaz

The tomb, located in the city of Bijapur, or Vijapur in Karnataka, southern India, was built in 1659 by the famous architect, Yaqut of Dabul. The structure consists of a massive square chamber measuring nearly 50 m (160 ft) on each side and covered by a huge dome 43.3 m (142 ft) in diameter making it among one of the largest dome structures in world. The dome is supported on giant squinches supported by groined pendentives while outside the building is supported by domed octagonal corner towers. The Dome is the second largest one in the world which is unsupported by any pillars. The acoustics of the enclosed place make it a whispering gallery where even the smallest sound is heard across the other side of the Gumbaz. At the periphery of the dome is a circular balcony where visitors can witness the astounding whispering gallery. Any whisper, clap or sound gets echoed around 7 times. Anything whispered from one corner of the gallery can be heard clearly on the diagonally opposite side. During the time of Sultan Ibrahim Adil Shah, the musicians used to sing, seated in the whispering gallery so that the sound produced could reach every corner of the hall.



Scientific Programme

SCIENTIFIC PROGRAMME

Time	15th December, 2010	16th December, 2010	17th December, 2010
8: 00	Registration	Breakfast	Breakfast
9:00		The Physiological Society GL Brown Lecture 2010 Graham McGeown (Queen's University of Belfast, UK) Seeing is Believing! Imaging Ca^{2+}-Events in Living Cells	TR Raju, Head, Neurophysiology, NIMHANS, Bangalore, India 'Amyotropic Lateral Sclerosis- What can an animal model reveal?
9:10			
9:20			
9:30	Inauguration		Raghu Padinjat, National Centre for Biological Sciences, TIFR, Bangalore Genetic analysis of animal physiology in the post genomic era.
9:40			
9:50			
10:00		Mary Morrell (Imperial College London, UK) The Physiological Society Lecture 2010. 'Phenotyping of sleep disordered breathing'	D Majumdar, Addl. Director & Head, DIPAS/DRDO, India, Cognitive performance during onscreen reading: Effect of font type and size
10:10			
10:20			
10:30	Inaugural Plenary: PS Shetty, Univ of Southhampton, UK and Emeritus Prof, St John's Medical College, Bangalore, India "Is whole body physiology relevant in the post-genomic era?"	Arif Siddiqui, Secretary General, SAAP, Islamabad, Pakistan, Neuroendocrine programming of sex differences in the brain	PSI Vice-Presidential Lecture. Shyamal Roy Choudhury. "Physiology Teaching in India: Some Problems & Prospects"
10:40			
10:50			
11:00	Break	Break	Prize Presentations: Oral communications*
11 :10			
11:20	PSI Presidential Lecture: *Debjani Guha, Univ. of Calcutta, Kolkata.* "Neuroprotection by BH in experimental epileptogenesis	Parallel Symposia Glucose homeostasis Stress and Depression Physiology in unusual environments	
11:30			Break
11:40			
11:50	Professor P.B. Sen Memorial Oration : Parimal C. Sen, Division of Molecular Medicine, Bose Institute, Kolkata. Endogenous modulators in the regulation of ion transporting enzymes : A historical account, recent developments and future perspectives		Parallel Mini Symposia Sleep Epigenetics
12:00			
12:10			

12:20	Anura V Kurpad. St John's Medical College, Bangalore. Physiology Fluxomics and Fetal growth and programming.		
12:30			
12:40		Lunch	Lunch
12:50	Lunch		
1:00			
1:10			
1:20			
1:30		Edathil Vijayan, Cochin Univ of Science & Technology, Kochi. "Signal molecules in the hypothalamus controlling GnRH release"	
1:40			Technical Presentation: AD Instruments
1:50			
2:00	PSI General Secretary Lecture: Amar K Chandra, Univ of Calcutta, Kolkata " Thyroid Physiology under the influence of tea flavonoids"	BB Sarkar Oration: Sandhya T Avadhany. St John's Medical College, Bangalore. Human variability and nutrition: -omics sciences and whole body approaches in health and disease	Special Panel Discussion Medical Education: defining the role of Physiologists in South Asia
2:10			
2:20			
2:30	Asok Kumar Ghosh, Univ. of Malaya, Malaysia, 'Sports Physiology' "Applied Physiology Of Singles Badminton"	Dr. (Mrs.) Chitralekha Mukherjee Memorial Oration: Hemanta Koley, National Institute of Cholera and Enteric Diseases, Kolkata. Protective efficacy and Immunogenicity of a live transconjugant hybrid strain of *Shigella dysenteriae* type 1 in Animal models.	
2:40			
2:50			
3:00	DSA Majid, Professor & Director, Dept. of Physiology, Tulane University, USA "Role of pro-inflammatory cytokines in the development of angiotensin-II induced hypertension."	Aziz Ali Najam, Shifa College of Medicine, Islamabad, Pakistan 'Ethics and Empathy in Medical Education'	
3:10			
3:20			
3:30	Poster viewing	Poster viewing	
3:40			Young Scientists Presentations
3:50			
4:00			
4:10	Free Paper Presentations (Parallel Sessions)	Free Paper Presentations (Parallel Sessions)	
4:20			
4:30			
4:40			Break
4:50			Awards and Presentations
5:00			
5:10			Closing Remarks
5:20			
5:40		SAAP Meeting	
6:30		Entertainment followed by Dinner	
7:00	Dinner		

- 3 speakers of the free paper sessions will be chosen based on assessment for presentation to the whole conference gathering on the last day and award of the Prize for best Oral Paper.

SYMPOSIA

Physiology in unusual environments

1. Wg Cdr DK Dubey, Institute of Aerospace Medicine, Bangalore, India, 'Man In Thermal Environment'
2. Lt Col PT Selvaraj, Institute of Aerospace Medicine, Bangalore, India 'Man in Hyperbaric Environment'
3. Dr. Savi Wimalasekera, University of Sri Jayewardenepura, Sri Lanka, 'Man in Space'

Stress and Depression

1. **Dr. B.N. Srikumar,** Université Bordeaux, France 'Reversal of stress-induced impairment of hippocampal long-term potentiation and spatial learning in rats by dopaminergic and cholinergic drugs'
2. Dr. Veena J, Université Bordeaux, France 'Modulation of adult neurogenesis and behavioural depression by stress, enrichment and pharmacological agents'
3. Dr. B.S.Shankaranarayana Rao, Neurophysiology, NIMHANS, Bangalore 'Cellular and Molecular basis of Depression-induced Cognitive Deficits"

Glucose Homeostasis

1. Assoc. Prof. Rohit Kulkarni, Joslin Diabetes Centre, Harvard Medical School, Boston USA. "Genetic and translational approaches to exploring islet biology"
2. Prof Nihal Thomas, Endocrinology, Christian Medical College, Vellore "Evolution of Noncommunicable disease in Rural India-and the influence on Low Birth on body composition, energy expenditure and insulin sensitivity in a Rural Dravidian community.
3. Prof Ganapathy, Endocrinology, St. John's Medical College, Bangalore "Clinical Phenotypes in Diabetes"

MINI SYMPOSIA

Sleep Physiology

1. Prof Bindu Kutty, Neurophysiology, NIMHANS, Bangalore " Sleep , Wake and hippocampal theta gamma activity : Relevance in Memory consolidation"
2. Prof George D'Souza, Chest Medicine and Sleep Lab, St. John's Medical College, Bangalore "Sleep phenotypes: What's in it for the Physiologist?"

Epigenetics

1. Prof Tapas Kundu, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore "Epigenetics: Gene regulation and Disease"
2. Prof TS Sridhar, Molecular Medicine, St. John's Research Institute, Bangalore "Epigenetic Regulation in Cancers"

Special SAAP Panel Discussion

Convener: Prof. Mohammed Aslam – Pakistan:

1. Bishnu Hari Paudel, Nepal
2. Sharaine Fernando, Sri Lanka "Teaching Physiology within an Integrated Curriculum"
3. Abida Ahmad, Bangladesh
4. GK Pal, India. Relevance of Physiology in Medical Curriculum
5. Muhammad Aslam, Pakistan "Contents, Context and Concepts in Physiology Teaching"

Abstracts

Codes for Abstracts

FC- FREE COMMUNICATION ORAL (e.g. FC-C-01)

PP- POSTER COMMUNICATION (e.g. PP-A-02)

Category Codes

- **A** - Renal Physiology
- **B** - Autonomic
- **C** - Hematology
- **D** - Gastrointestinal Physiology
- **E** - Endocrine Physiology
- **F** - Reproductive Physiology
- **G** - Neurophysiology
- **H** - Cardiovascular Physiology
- **I** - Respiratory Physiology
- **J** - Exercise and sports physiology
- **K** - Ergonomics
- **L** - Pharmacology and toxicology
- **M** - Miscellaneous
- **N** - Medical education
- **O** - Nutrition

Free Communication Oral

DATE: 15/12/2010

CONFERENCE HALL 1—— (CODE: B, C and D)

CONFERENCE HALL 2—— (CODE: E and F)

AUDITORIUM —— (CODE: G)

DATE: 16/12/2010

CONFERENCE HALL 1—— (CODE: H, I and K)

CONFERENCE HALL 2—— (CODE: J and L)

AUDITORIUM —— (CODE: M, N and O)

Poster Presentation

DATE: 15/12/2010

HALL 1 ANNEXE— (CODE: PP-A-01 to PP-E-09)

HALL 2 ANNEXE— (CODE: PP-E-10 to PP- G-28)

DATE: 16/12/2010

HALL 1 ANNEXE— (CODE: PP-H-05 to PP-J-08)

HALL 2 ANNEXE— (CODE: PP-J-09 to PP-O-12)

Free Communications

DATE: 15 / 12 / 2010 TIME: 4PM TO 6PM VENUE: Conference HALL 1

TOPICS: AUTONOMIC (CODE – B), HEMATALOGY (CODE – C), GASTROINTESTINAL PHYSIOLOGY (CODE – D)

1. **FC-B-01** Decreased Valsalva Ratio in Nondiabetic Offspring of Type-2 Diabetic Parents. **Sangeeta D Tuppad** B.L.D.E.U's Shri B.M.Patil Medical College, Bijapur, Karnataka.
2. **FC-C-01** Effect of Air Pollution on Platelet Aggregability and Prothrombin Time. **Jayshree S Kharche.** Bharati Vidyapeeth University Medical College, Pune, Maharashtra.
3. **FC-C-02** Glucose-6-Phosphate Dehydrogenase (G6PD) Enzyme Status: in Health and Disease. **Noorzahan Begum**. BSMMU, Dhaka, Bangladesh.
4. **FC-C-03** Effects of Vitamin E Supplementation on Some Aspects of Hematological Variables in Patients of Hemolytic Anemia with Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency. **Nayma Sultana.** Sir Salimullah Medical College, Mitford, Dhaka, Bangladesh.
5. **FC-D-01** Study on The Hepatoprotective Effect of Oyster Mushroom (Pleurotus Florida) Against Paracetamol Induced Liver Damage in Wistar Albino Rats. **Afroza Khanam Sumy.** Sir Salimullah Medical College, Mitford, Dhaka, Bangladesh.
6. **FC-D-02** Gender Difference in the Ventromedial Hypothalamic Regulation of Food Intake and Body Weight in Rat Model: Correlation with Lipid and Thyroid Profiles and Insulin Resistance. **Sebanti Dev.** JIPMER, Pondicherry.
7. **FC-D-03** Protective Effect of Aegle Marmelos in Ameliorating Oxidative Stress in Experimental Models of Peptic Ulcer. **Purnima Singh.** Rungta College of Dental Sciences & Research, Chhattisgarh.

DATE: 15 / 12 / 2010 TIME: 4PM TO 6PM VENUE: Conference HALL- 2

TOPICS: ENDOCRINE PHYSIOLOGY (CODE-E), REPRODUCTIVE PHYSIOLOGY (CODE-F)

1. **FC-E-01** Dolichos Biflorus Ameliorates Diabetic Nephropathy. **Yogesh Saxena**. Himalayan Institute of Medical Sciences, HIUT University, Dehradun, Uttrakhand.
2. **FC-E-02** Effect of SRCT (Salacia Reticulata W. And Clitoria Ternatea L.), A Polyherbal Formulation on Cognitive Impairment and Behavioural Changes in Streptozotocin Induced Diabetes of Early Onset in Rats. **Rajashree Ravishankar**. J.N.Medicalcollege, Belgaum, Karnataka.
3. **FC-E-03** Endocrine Profile and Skeletal Health. **M.Basu**. Defense Institute of Physiology and Allied Sciences, Delhi.
4. **FC-F-01** Effect of Nigella Sativa Seeds Extract on the Reproductive Parameters in Male Rats. **S. Abdul Saeed.** Department of Biological & Biomedical Sciences. Aga Khan University, Karachi, Pakistan.

5. **FC-F-02** A Comparative Study on Nutritional Status and Onset of Menopause among Socio-Economically Poor Rural Women of Birbhum District of West Bengal. **Krishna Roy**. Hoogley Mohsin College, Chjinsurah, Hoogley, West Bengal.
6. **FC-F-03** Studies of Antigonadal Activity of Kesardam (Jussiaea Repens) in Male Albino Rats. **N.K.Pradhan**. Presidency College, Kolkata, West Bengal.
7. **FC-F-04** Amelioration of Arsenic Induced Male Reproductive Malfunctions By Strategic Modulations of Dietary Proteins in Rat. **Prabir KR Mukhopadhyay,** Presidency College, Kolkata, West Bengal.
8. **FC-F-05** Iron, Zinc and Endometriosis: A Preliminary Study. **Nalinda Silva.** University of Sri Jayewardenepura, Sri Lanka.
9. **FC-F-06** Endocrine Correlates of Polycystic Ovary Syndrome (PCOS) in Pakistani Women. **Muhammad Akram.** King Edward Medical University, Lahore.

DATE: 15 /12 / 2010 **TIME: 4PM TO 6PM** **VENUE: AUTIDORIUM**

TOPICS: NEUROPHYSIOLOGY (CODE-G)

1. **FC-G-01** Environmental Enrichment Ameliorates Depression-Induced Cognitive Deficits and Impaired Hippocampal Synaptic Plasticity. **Mahati K.** National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangaluru.
2. **FC-G-02** Amygdalar Inactivation Prevents Stress-Induced Cognitive Deficits And Impaired Hippocampal Long-Term Potentiation. **Christofer T.** National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangaluru.
3. **FC-G-3** Celastrus Paniculatus Willd Ameliorates Stress-Induced Learning and Memory Deficits, Impaired Hippocampal Long-Term Potentiation and Restores Acetylcholinesterase Activity. **V. Bhagya.** National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangaluru.
4. **FC-G-04** Effects of Iron Supplementation on Cognitive Function in Iron Deficient Adolescent Females; Results from Sri Lanka. **Savithri W Wimalasekera.** University of Sri Jayewardenepura, Nugegoda, Colombo, Srilanka.
5. **FC-G-05** Evaluation of Acoustic Shock-Induced Hearing Loss with Audiometer and Distortion Product Otoacoustic Emissions. **Vinodh Raguttahalli Sriramareddy**. Vydehi Institute of Medical Sciences and Research Center, Bangalore, Karnataka.
6. **FC-G-07** Differential Superoxide and Peroxide Handling Capacities of Brain Regions: Implication in Neurodegenerative Disorders. **Prasunpriya Nayak**. NRI Medical College & General Hospital, Chinna Kakani, Andhra Pradesh.
7. **FC-G-08** Antinociceptive and Anti-Inflammatory Activities of Essential Oil of Nepeta Crispa Willd in Experimental Rat Models. **Taskina Ali.** Tarbiat Modares University, Tehran, Iran.
8. **FC-G-09** A Cross-Sectional Study to Assess Hearing Impairment in School Going Children Aged 6 To 10 Years of Bangalore. **Sonal Ramdas Gaonkar**. Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka
9. **FC-G-29** Biomedical Aspects of Neurophysiology at high Altitude. **Kalpana Hota**, Defence Institute of Physiology and Allied Sciences, DRDO, Delhi.

Poster Presentation

DATE: 15 / 12 / 2010 TIME: 3.15 PM ONWARDS VENUE: HALL 1 ANNEXE

TOPICS: RENAL PHYSIOLOGY (CODE – A), AUTONOMIC (CODE – B), HEMOTOLOGY (CODE – C), GASTROINTESTINAL PHYSIOLOGY (CODE – D), ENDOCRINE PHYSIOLOGY (CODE – E)

1. **PP-A-01** A Study of Platelet Count and Bleeding Time in Chronic Renal Failure (CRF) Patients and the Effect of Dialysis. **Ranjana Dhar**, Assam Medical College, Dibrugarh, Guwahati, Assam, India.
2. **PP-A-02** Chronic Renal Failure and Cognitive Functions in Uremic Rats. **Merin Iype**, Mahatma Gandhi Institute Of Medical Sciences, Pillyarkuppam, Pondicherry, India
3. **PP-B-02** Normative Data of Spontaneous Baroreflex Sensitivity in A Healthy South Indian Population – A Pilot Study. **Meghana A**, Dept. of Neurophysiology, NIMHANS, Bangalore, India.
4. **PP-B-03** Evaluation of Cardiovascular Autonomic Functions in Obesity. **Kiran Dagadu Thorat**, MVP Dr.Vasantrao Pawar Medical College, Adgaon, Nashik, Maharashtra, India.
5. **PP-B-04** Time Domain Indices of Heart Rate Variability in Obese Young Adults. **Rajalakshmi R**, JSS Medical College, Mysore, Karnataka, India.
6. **PP-B-05** Comparative Study of Heart Rate Variability, Heart Rate and Blood Pressure in Different Phases of Menstrual Cycle in Healthy Young Women Aged 18-22 Years. **Usha Rani YS**, Navodaya Medical College, Raichur, Karnataka, India.
7. **PP-B-06** Effect of Coronary Angioplasty on Heart Rate Variability Parameters. **Anahita Damodar Kini**, MS Ramaiah Medical College, Bangalore, Karnataka, India.
8. **PP-B-07** Evaluation of HRV as a Marker of Cardiac Autonomic Neuropathy in Type I Diabetics. **Beena Vishwas Kumbhojkar**, JJMMC, Davangere, Karnataka, India.
9. **PP-B-08** Assessment of Autonomic Nervous Activity in Autistic Children. **Shailaja Shivaram Moodithaya**, K.S. Hegde Medical Academy, Mangalore, Karnataka, India.
10. **PP-B-9** Study of Autonomic Dysfunction in Obesity. **Shivaraj M**, Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India
11. **PP-B-10** Reproducibility of Short-Term HRV Parameters during Different Physiological States. **Elizabeth Tharion**, Christian Medical College, Vellore, India.
12. **PP-B-11** A Study of Heart Rate Variability To Determine The Stability Of Blood Pressure During General Anaesthesia. **Jagadamba Aswathappa**, Sri Devaraj Urs Medical College, Kolar, Karnataka, India
13. **PP-B-12** Evaluation Of Cardiovascular Autonomic Function In Diabetic Patients Using Standard Autonomic Functions Test. **Prakash SB**, Basaveshwara Medical College, Chitradurga, Davangere, Karnataka, India.

14. **PP-B-13** Cardiorespiratory Fitness and HRV in Amateur Athletes: Randomized Control Study. **Nirmala B Naidu**, Yenepoya University, Mangalore, Karnataka, India

15. **PP-B-14** Autonomic Status in Iron Deficient Anemic Adolescents. **Gandhi A**, Lady Hardinge Medical College And Associated Hospitals.

16. **PP-B-15** Heart Rate Variability and Wellbeing Index after Sleep Deprivation **Kirthana Kunikullaya U**, MS Ramaiah Medical College, Bangalore, Karnataka, India.

17. **PP-B-16** Heart Rate Variability in Patients with Essential Hypertension. **Rehnuma Tabassum**, BSMMU, Shahbag, Dhaka, Bangladesh.

18. **PP-B-17** Comparison of Cardiac Autonomic Nervous Activity between Obese and Nonobese Young Adults Using Heart Rate Variability Test and Hand Grip Dynamometer Test. **Khwaja Nawazuddin Sarwari**, JJM Medical College, Davangere, Karnataka, India.

19. **PP-B-18** Evaluation of Cardiovascular Sympathetic Activity during the 1st And 2nd Trimesters of Pregnancy. **Sandeep Harinarayan Ghuge**, Rural Medical College, Loni, Maharashtra, India.

20. **PP-B-19** Assessment of Sympatho-Vagal Imbalance by a Simple Test of One Minute Heart Rate Variability in Patients. **Fareeda Banu Abdulkareem Balikai**, SS Medical College, Mysore, Karnataka, India

21. **PP-B-20** Decrease in Cardiovascular Parasympathetic Function Tests With Age In Adults (18-65 Years). **Shrilaxmi Chandrashekar Bagali**, BLDEU's Shri BM Patil Medical College Hospital & Research Centre, Bijapur, Karnataka, India.

22. **PP-B-21** Cardiovascular Response to Short Term Head Up Tilt. **Ajay KT**, JJM Medical College, Davangere, Karnataka, India.

23. **PP-B-22** Acute Effect of Alternate Nostril Breathing on Autonomic Functions. **Priyanka Singh**, HIHT, Jollygrant, Dehradun, Uttarakhand.

24. **PP-B-23** Comparison of Resting HRV in Habitual Caffeine Consumers with and without Pre-Test Abstinence of Caffeinated Beverages. **Gnanasenthil G**, Christian Medical College, Vellore, Tamilnadu, India.

25. **PP-B-24** Comparative Study of Short-Term HRV Measures at Two Different Time Periods of The Day In Healthy Subjects. **R.Rajalakshmi**, Department of Physiology, Christian Medical College, Vellore.

26. **PP-B-25** The Effect of Vitamin B_{12} Status on Heart Rate Variability in a Healthy Elderly Population in South India. **Sucharita S**, Department of Physiology, St John's Medical College, Bangalore and St John's Research Institute, Bangalore.

27. **PP-C-04** A Study of Hematological Parameters of Newborn from Umbilical Cord Blood. **Chandrika Gogoi**, Assam Medical College and Hospital, Dibrugarh, Assam, India.

28. **PP-C-05** Study of the Relation of Cord Blood Hemoglobin and Maternal Hemoglobin. **Abhijit Dastidar**, Assam Medical College, Dibrugarh, Assam, India

29. **PP-C-06** Study of Distribution of ABO and Rh Groups in Diabetes Mellitus. **Manas Pratim Borah**, Assam Medical College, Dibrugarh, Assam, India

30. **PP-C-07** Hematological Changes in Cement Factory Workers of Bagalkot. **Clevin Rashmi Rebello**, S.Nijalingappa Medical College, Bagalkot, Karnataka, India.

31. **PP-C-08** Glucose-6-Phosphate Dehydrogenase (G6PD) Status in Neonatal Jaundice and Its Relationship with Severity of Hyperbilirubinemia. **Nilufa Akhter**, Bangladesh Institute of Child Health, Bangladesh
32. **PP-C-09** Changes in Osmotic Behavior of RBC in Normal Pregnancy with and without Anemia. **Rezina Akter**, Sir Salimullah Medical College, Mitford, Dhaka, Bangladesh
33. **PP-C-10** A Comparative Study to Determine the Incidence of Pancytopenia among The Different Ethnic Groups in Balochistan and Afghanistan. **Saleh Mohammad Tareen,** University of Balochistan, Quetta, Pakistan.
34. **PP-C-11** Frequency of Blood Group Occurrence in Pregnant Women. **Rashida Bhatti**, University of Sindh, Jamshoro & Isra University, Hyderabad, Pakistan.
35. **PP-C-12** A Study of Differential Leukocyte Counts During Different Phases of The Menstrual Cycle. **Ava Dihingia**, Assam Medical College, Dibrugarh, Assam, India
36. **PP-C-13** Platelet Aggregation, Plasma Fibrinogen Level and Euglobulin Clot Lysis Time in Male Hypertensive Patients. **Aradhana Arvind Deshmuk**h, Government Medical College, Aurangabad, Maharashtra, India.
37. **PP-C-14** A Study of Platelet Count in Pregnancy and Labour. **Tazkira Begum**, Assam Medical College and Hospital, Dibrugarh, Assam, India.
38. **PP-C-15** A Simple Imaging Method for Demonstrating Red Cell Sizes to Life Sciences Students. **Satish Kumar NS**, Yenepoya Medical College, Mangalore, Karnataka, India
39. **PP-C-16** Association between ABO Blood Groups and Patients with Pregnancy Induced Hypertension. **Dr. Vinod PT**, Rural Medical College, Loni, Maharashtra, India.
40. **PP-D-04** Prevalence of Irritable Bowel Syndrome in Adult Asthmatics. **Spandana Charles**, Sri Ramachandra University, Chennai, Tamil Nadu, India.
41. **PP-D-05** Effect of Curcumin on Gastric Emptying in Albino Rats. **Abha Shrivastava**, Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India.
42. **PP-E-04** The Influence of Gestational Diabetes Mellitus on Fetal Weight. **KJ Vedavathi,** Rajarajeswari Medical College and Hospital, Bangalore, India.
43. **PP-E-05** The Relationship of Parasympathetic Nerve Function Parameters with Endogenous Estrogen Level in Postmenopausal Women. **Latifa Afrin Dill Naher,** Prime Medical College, Rangpur, Bangladesh.
44. **PP-E-06** Impact of Stress on Menstrual Pattern of Medical Students. **Shobha Das**, VMMC & Safdarjung Hospital, New Delhi, India.
45. **PP-E-7** Association of Waist Circumference with Glycemic Control in Healthy Adults. **Vinitha K Rudramuni**, MS Ramaiah Medical College, Bangalore, Karnataka, India
46. **PP-E-8** A Study of Relation between Anthropometric Measurements and Lipid Profile. **Sumit Garg**, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.
47. **PP-E-9** Visual Evoked Potentials in Diabetes Mellitus. **Bhanu Ravilla**, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

DATE: 15 / 12 / 2010 TIME: 3.15 PM ONWARDS VENUE: HALL 2 ANNEXE

TOPICS: ENDOCRINE PHYSIOLOGY (CODE – E), REPRODUCTIVE PHYSIOLOGY (CODE – F), NEUROPHYSIOLOGY (CODE – G)

48. **PP-E-10** Random Serum Cortisol Levels in Subjects with Recurrent Aphthous Stomatitis. **Arun Kumar M**, MS Ramaiah Medical College, Bangalore, Karnataka, India.

49. **PP-E-11** Comparision of Biochemical Indices between Controls and Diabetics. **Betigeri Vithal Kumar Anupama,** VMMC & Safdarjung Hospital, New Delhi, Delhi, India.

50. **PP-E-12** Autonomic Functions And Serum Leptin Levels In Normal Weight And Overweight Young Indian Females. **Arvind Kanchan**, Lady Hardinge Medical College and Associated Hospitals, New Delhi, Delhi, India.

51. **PP-E-13** Study Of Heart Rate Variability (HRV), Fasting Blood Sugar (FBS) and Lipid Profile in Subjects with and without Parental History of Type 2 DM. **Deepika Kamath M**, Sri Siddhartha Medical College,Tumkur, Karnataka, India.

52. **PP-E-14** Correlation of Body Mass Index, Waist Circumference and Waist Height Ratio with Lipid Profile in First Degree Relatives with a Family History of Type 2 Diabetes Mellitus. **Shobha Reddy**, Sri Siddharatha Medical Collage, Tumkur, Karantaka, India.

53. **PP-E-15** Effect of Glycemic Control on Microalbuminuria in Type 2 Diabetics. **Kirthana U Kunikullaya,** MS Ramaiah Medical College, Bangalore, Karnataka, India

54. **PP-E-16** Hyperglycaemia and Insulin Resistance: What Comes First? **Pramod Sakharam Patil**, Bharati Vidyapeeth Medical College, Pune, Maharashtra, India

55. **PP-E-17** Co-Relation between Glycosylated Hemoglobin and Reaction Time (Visual and Auditory) in Diabetics – A Cross-Sectional Study. **R Niruba Kannan**, Annapoorna Medical College, Salem, Tamil Nadu, India.

56. **PP-E-18** Intraocular Pressure (IOP) Changes in Postmenopausal Hypertensive Women – Need for Screening? **Sushma S**, Vydehi Institute of Medical Sciences and Research Center, Bangalore, Karnataka, India.

57. **PP-E-19** Implications of *Klotho* Gene to Insulin Resistance Syndrome and Other Age-Related Disorders: A Meta-Analysis. **Ulfat Baig,** Indian Institute of Science Education and Research, Pune, Maharashtra, India.

58. **PP-E-20** Glycosylated Hemoglobin (HBA1c) in Type I Diabetes with and without Complications .**Munibuddin Muntajibuddin Ahmed**, Govt. Medical College, Aurangabad, Maharashtra, India

59. **PP-E-21** Effects of Physical Exercise and Hormone Replacement Therapy on Lipid Profile Status in the Postmenopausal Women. **Prof. Nasim Jahan,** *Sir Salimullah Medical College, Dhaka.*

60. **PP-E-22** Study of Lipid Profiles in Shift Workers. ***Md Abedur Rahman,***

61. **PP-E-23** Exposure to Low Doses of Diazinon Induces Teratospermia and Oligozoospermia in Wistar Rats. **Damodar D**, KVG Medical College, Sullia, Karnataka, India.

62. **PP-E-24** Comparison of VO_2max and Reaction Time in Premenstrual and Postmenstrual Phase. **Gayatri Rangnath Godbole**. Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India.

63. **PP-E-25** Study of the Fasting Blood Glucose in Obese & Pre-Obese Women in The Age Group of 45 - 49 Yrs. **A Pranita**, Bharati Vidyapeeth Medical College, Dhankawadi, Pune, Maharashtra, India.

64. **PP-E-26** Effect of Walking on Blood Sugar in Diabetics Compared to Normal. **Regandla Sirisha Mahesh**, Guntur Medical College, Guntur, Andhra Pradesh, India

65. **PP-E-27** Body Weight Variations during Normal Menstrual Cycle. **Suchet Trigotra**, MMIMSR Mullana (Ambala), Haryana, India.

66. **PP-E-28** Bone Strength and Its Determinants in Peri and Postmenopausal Groups of Pakistani Women. **Farida Hafeez**, CMH Lahore Medical College, Lahore, Pakistan.

67. **PP-F-07** Inter-Relationship between Waist Circumference, Hip Circumference, Sperm Count and Total Sperm Motility. **Prasad A Udhoji**, T.N.M.C. & B.Y.L Nair Ch. Hospital, Mumbai, India.

68. **PP-F-08** Epididymal Secretory Proteins and Their Role in Sperm Maturation. **Masood A Qureshi**, Institute Of Basic Medical Sciences, Dow University Of Health Sciences, Karachi, Pakistan.

69. **PP-F-09** Evaluation of Cardiovascular Response to Exercise in Different Phases of Menstrual Cycle. **Rainha IJ Desouza**, Goa Medical College, Bambolim, Goa, India

70. **PP-F-10** Impact of Estradiol on PGE_2 Production by Endometrial Stromal Cells of Buffalos. **S Mondal**, National Institute Of Animal Nutrition And Physiology, Adugodi, Bangalore, India.

71. **PP-F-11** Preterm Delivery: Role of Zinc and Copper. **Masuda Sultana**, Dhaka Community Medical College, Dhaka, Bangladesh.

72. **PP-F-12** Effect of Age of Animals and Dose of Gonadotropins on the Quality of Normal and Manipulated Mice Embryos. **S Nandi**, National Institute of Animal Nutrition and Physiology (NIANP), Bangalore, India.

73. **PP-F-13** Hematological and Electrocardiographic Variations during Menstrual Cycle. **Rajnee Choudhary**, Sardar Patel Medical College, Bikaner, Rajasthan, India,

74. **PP-F-14** Physiological Ocular Changes during Pregnancy. **Paramjyothi Pitta**, Kakatiya Medical College ,Warangal, Andhra Pradesh, India

75. **PP-F-15** Modifiable Risk Factors Associated with Quality of Semen in Men Investigated for Infertility. **Fernando DMS**, University of Sri Jayawardenapura, Nugegoda, Sri Lanka.

76. **PP-G-10** Evaluation of Nerve Conduction Velocity in Obese Individuals. **Kannan K**, Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

77. **PP-G-11** An Experimental Study to Evaluate the Effect of Instrumental Indian Classical and Western Music Therapy on Learning and Memory in Stress-Induced Young Rats. **Harpreet Kour**, Dept. of Physiology, JN Medical College, Belgaum, India.

78. **PP-G-12** Sleep Study (Obstructive Sleep Apnea) in Obesity. **Padma K**, Institute Of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

79. **PP-G-13** To Study the Effect of Height on Nerve Conduction Velocity in Young Healthy Females. **Shradha Borkar**, NMC, Raichur, India.

80. **PP-G-14** Study of Auditory and Visual Evoked Potentials in Obese Individuals. **Anantha Subramaniam,** Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

81. **PP-G-15** Effect of Posture on Intraocular Pressure. **Satish Sharnappagouda Patil**, Navodaya Medical College, Raichur, Karnataka, India.

82. **PP-G-16** Impact of Sleep Deprivation on Mood and Recent Memory in Medical Students. **Renuka Sharma**, VMMC & Safdarjung Hospital, New Delhi, Delhi, India

83. **PP-G-17** Age and Gender Variation in Efficiency of Motor Performance by Bimanual Coordination Test. **Ashwini K Shetty**, Sri Devraj Urs Medical College, Kolar, Karnataka, India.

84. **PP-G-18** Study of Relation of Iron Defeciency Anemia and Cognition among School Children. **Padmini Thalanjeri,** Sri Devraj Urs Medical College, Kolar, Karnataka, India.

85. **PP-G-19** Correlation between Neuropsychological Test Results (Mmse) and P300 Latency in Adults above 50 Years. **Kavana Gowthamapura Venkatappa**, Sri Devraj Urs Medical College, Kolar, Karnataka, India.

86. **PP-G-20** Level of Serum Electrolyte in Depression Patients. **Priyanka Srivastava**, VMMC & Safdarjung Hospital, New Delhi, Delhi, India.

87. **PP-G-21** A Comparative Study of the Middle Latency Auditory Evoked Potentials in the Totally Blind and Normal Subjects. **Manjula P Ebenezar,** MS Ramaiah Medical College, Bangalore, Karnataka, India.

88. **PP-G-22** Study on Color Blindness and Reduced Vision with Erythrocyte G6PD Enzyme Status among the School Children of Dhaka City. **Ayesha Yasmin**, Enam Medical College, Savar, Dhaka, Bangladesh.

89. **PP-G-23** Comparative Study of Sleep Quality among Morning and Evening Batch Pharmacy Students. **Ali Muhammad Soomro**, Faculty of Pharmacy, University Of Sindh, Jamshoro, Pakistan.

90. **PP-G-24** Assessment of Hearing Loss in Term and Preterm Babies Admitted to NICU. **Anshul Sharma,** JJMMC, Davangere, Karnataka, India.

91. **PP-G-25** Association of Consanguinity and Hearing Impairment. **Mangala Gowri Shamnur Rajshekar,** JJM Medical College, Davangere, Karnataka, India.

92. **PP-G-26** Relationship between Intraocular Pressures of Both the Eyes before and after Water Ingestion. **Shailaja Siddanagouda Patil,** S Nijalingappa Medical College, Bagalkot, Karnataka, India.

93. **PP-G-27** A Study of Anterior Chamber Depth by Ultrasound A-Scan Biometry. **Chinmoyee Baruah,** Assam Medical College, Dibrugarh, Assam, India.

94. **PP-G-28** Effect of Refractive Error and Valsalva Maneuver on Intraocular Pressure. **Yogesh MK,** Ramaiah Medical College, Bangalore-54.

95. **PP-B-26** Alterations in Autonomic Response at high attitude: A comparative study among acclimatized Low Landers, high altitude natives and Low Landers. **Priyanka Dhar,** Defence Institute of Physiology and Allied Sciences, DRDO, Delhi.

Free Communication

DATE: 16 /12 / 2010 **TIME: 4PM TO 6 PM** **VENUE: Conference HALL-1**

TOPICS: CARDIOVASCULAR PHYSIOLOGY (CODE-H), RESPIRATORY PHYSIOLOGY (CODE-I), ERGONOMIC (CODE-K)

1. **FC-H-01** Sympathoexcitation Mediated Autonomic Imbalance in Nitric Oxide Deficient Hypertensive Rats: Role of Oxidative Stress. **Meenakshi Chaswal.** Vardhaman Mahavir Medical College and Safdarjung Hospital, New Delhi.
2. **FC-H-02** Effect of Hypoxia and Hyperoxia on Generation of Vascular Endothelial Growth Factor (VEGF) and Endothelial Nitric Oxide Synthase (ENOS) in Pulmonary Artery Endothelial Cells and Its Co Relation with Alteration in Reactive Oxygen Species (ROS) Level. **Farmanullah Wazir**. Kust Institute of Medical Sciences, KOHAT, Pakistan.
3. **FC-H-03** Cardiovascular Autonomic Functions Impaired in Patients Presenting with Anginal Symptoms with Normal Thallium-201 Myocardial Perfusion SPECT. **Khadka R.** BPKIHS, Dharan, Nepal.
4. **FC-H-04** Systolic Pressure Variation as a Guide to Fluid Therapy in Mechanically Ventilated Patients after Open Heart Surgery. **Vidyashree.** JN Medical College, KLE University, Belgaum, Karnataka.
5. **FC-I-01** Effect of Gender and Body Composition on Fractional Exhaled Nitric Oxide Levels in Healthy Adults. **Dr Syed Shahid Habib**. College of Medicine & King Khalid UniversityHospital, SaudiArabia.
6. **FC-I-02** Respiratory Pressures and Lung Mechanics in Young Adult Smokers and Non Smokers. **Hasan S**. CMH Lahore Medical College, Lahore-Pakistan.
7. **FC-I-03** Effect of Stove Intervention on Nasal Mucociliary Clearance among Rural Women. **Ashok Jaganathan**. Sri Ramachandra University, Chennai, Tamilnadu.
8. **FC-I-04** Effect of Aerobic Exercise Training on Pulmonary Function Tests: A Pragmatic Randomized Controlled. **Chaitra Nagaraja Bidare**. J. M. Medical College, Davangere, Karnataka.
9. **FC-I-32** Physidogical and metabolic correlates of AMS. **Sunil K Hota**. Defence Institute of Physiology and Allied Sciences, DRDO, Delhi.
10. **FC-K-01** Ergonomic of Ocular Stress and ocular surface imaging amongst Watchmakers/Repairers of Kolkata and Its Possible Preventive Measure. **Subrata Ghosh**. Presidency College, Kolkata, West Bengal.
11. **FC-K-02** Prevalence of Work Related Musculoskeletal Disorders among Sewing Machine Operators in Garment Factories in Sri Lanka. **Sudath Shirley Pathmasiri Warnakulasuriya.** Faculty of Medical Sciences, University of Sri Jayewardenepura, Colombo, Srilanka.
12. **FC-K-03** 2d:4d Ratio in Predicting Aggression amongst School Children in Kolkata. **Devashish Sen**. Presidency College, Kolkata.

DATE: 16 / 12 / 2010 TIME: 4PM TO 6PM VENUE: Conference HALL-2

TOPICS: EXERCISE AND SPORTS PHYSIOLOGY (CODE-J), PHARMACOLOGY AND TOXICOLOGY (CODE-L)

1. **FC-J-01** Comparative Study of Human Model Constructions in Different 3d Digital Human Modeling Softwares. **Sougata Karmakar**. Indian Institute of Technology. Guwahati, Assam.
2. **FC-J-02** Effect of Endurance Exercise on Brain Natriuretic Peptide (BNP). **Hafeezullah Wazirali**. College of Medicine, Northern Border University, Kingdom of Saudi Arabia.
3. **FC-J-03** Influence of Yogic Practice on Inflammatory Cytokines. **Ambarish Vijayaraghava**. M. S. Ramaiah Medical College, Bangalore, Karnataka.
4. **FC-J-04** Effect of Yogic Exercises on Motor Performance among Computer Users: A Randomized Controlled Trial. **Vidya Sunil Joshi**. Vydehi Institute of Medical Sciences & Research Centre, Bangalore, Karnataka.
5. **FC-J-05** A Comparative Study of Maximal Oxygen Consumption by Queen's College Step Test and Treadmill Jogging Test in Young Males. **Prabha Venkataravana Settee**. Chennai Medical College Hospital & Research Centre, Trichy,Tamilnadu.
6. **FC-L-01** A Comparative Study of Psychological Parameters in Migraneurs on Drug Therapy and on Electro Acupuncture. **Vijayalakshmi I**. Annapoorna Medical College & Hospital, Salem, Tamilnadu.
7. **FC-L-02** Cetirizine Produces Electroencephalographic Changes. **Shah DK**. KIST, Nepal.
8. **FC-L-03** Reno Protective Effect of Terminalia Arjuna Extracts on Acetaminophen Induced Uremic and Renal Failure Albino Male Rats. **Dilip Kumar Nandi.** Department of Human Physiology, Midnapore, West Bengal.
9. **FC-L-04** Hypolipedemic Effects of Cynodon Dactylon Extract I Wistar Rats Fed on High Cholesterol Diet. **Rashmi.K.S**. Kasturba Medical College-International Center, Manipal, Karnataka.
10. **FC-L-05** Rat in Vivo Experiments to Demonstrate the Effects of Cleistanthin. **B Rajam Krishna Subramanian**. Christian Medical College, Vellore, Tamil Nadu.
11. **FC-L-06** Diphyllin is A Non-Toxic Component of The Toxic Plant, Cleistanthus Collinus. **Latha Ramalingam.** Christian Medical College, Vellore, Tamil Nadu.

DATE: 16 / 12 / 2010 TIME: 4 PM TO 6 PM VENUE: AUDITORIUM

TOPICS: MISCELLANEOUS (CODE-M), MEDICAL EDUCATION (CODE-N), NUTRITION (CODE-0)

1. **FC-M-01** Carbon Sequestration in Nature: A Novel Concept in Bioremediation Within Microbe: Human Interface. **Mausumi Sikdar.** Presidency College, Kolkata.
2. **FC-M-02** Effect of Garlic (Allium Sativum) on Antioxidant Defense System in Erythrocyte of Albino Rats Exposed to Heavy Metals (Nickel Ii & Chromium Vi). **Amrita Das Gupta**. Environmental Health Research Unit, Department of Physiology, Al Ameen Medical College, Bijapur, Karnataka.

3. **FC-M-03** Cell Surface Protein Expression of Stem Cells from Human Adipose Tissue at Early Passage. **Solomon Sathishkumar**. Christian Medical College, Vellore.
4. **FC-M-04** Temporal Expression of Calcium/Calmodulin Dependent Adenylyl Cyclase Isoforms in Rat Articular Chondrocytes: Rt-Pcr And Immunohistochemical Localization **Ismail Memon**. Aga Khan University, Karachi, Pakistan.
5. **FC-N-01**Association between Students' Approach to Learning and Consistency of Their Academic Performance. **Komaladevi Sampath Damodar.** VIMS and RC, Bangalore.
6. **FC-N-02** Relationship between Types of Memory and Learning Styles Preferences in the 1st MBBS Students. **Usha G.Shenoy**. Sri Devraj Urs Medical College, Kolar, Karnataka.
7. **FC-O-01** Overweight: An Invitation to Health Risks Early in Life. **Nandita Das**. J.D. Birla Institute, Department of Sciences, Kolkata.
8. **FC-O-02** Study of Bone Mineral Density in Overweight Physically Active Postmenopausal Women. **Meena Kanu Parekh**. Bharati Vidyapeeth University, Sangli, Maharashtra.
9. **FC-O-03** Geometrical Quantification of Cell Membrane Integrity and Interactions with Body Fluids in Healthy Young Males. **Sreedhar S**. Department of Work Physiology and Sports Nutrition, Hyderabad.
10. **FC-O-04** Anthropometric Measurements in Arab Medical Students. **Mirza Mohammad Feisal Subhan**. Arabian Gulf University, Manama, Bahrain
11. **FC-O-05**Indirect Estimation of Body Fat Percentage (BF %) from Waist Girth (WG) of the Adult Males in Service Sector. **Sanchita Ghosh**. National Institute of Industrial Engineering (NITIE), Mumbai, Maharashtra.
12. **FC-G-06** Early School Start Timings Affect The Mood and Performance of Students. **Ruchi Singh**. V M M C & Safdarjung Hospital, New Delhi, Delhi

Poster Presentation

DATE: 16 /12 / 2010 TIME: 3.15 PM ONWARDS VENUE: HALL 1 ANNEXURE

TOPICS: CARDIOVASCULAR PHYSIOLOGY (CODE – H), RESPIRATORY PHYIOLOGY (CODE – I), EXERCISE AND SPORTS PHYIOLOGY (CODE – J)

1. **PP-H-05** Inexpensive Electrode Design for Recording Monophasic Action Potentials (Maps) from the Surface of Isolated Perfused Mammalian Heart. **Anand Bhaskar**, Christian Medical College,Vellore, Tamil Nadu, India.
2. **PP-H-06** Ferricyanide Reductase is Present in Frog Aorta. **J Prakasa Rao**, KMC Manipal, India.
3. **PP-H-07** Prevalence of ECG Abnormalities in Elderly Asymptomatic Males And Females. **Rupali Sachin Khane**, DY Patil Medical College, Kolhapur, Maharashtra, India
4. **PP-H-08** Prevalence of Prehypertension and Association of BMI with Blood Pressure in Prehypertensive Subjects. **Bharath T**, MS Ramaiah Medical College, Bangalore, Karnataka, India.
5. **PP-H-09** The Association of Systolic and Diastolic Blood Pressure in Under Weight, Normal Weight, Overweight and Obese Male Individuals in The Age Group Between 30 To 60 Years. **Santosh V Chidri**, Rural Medical College, Loni, Maharashtra, India
6. **PP-H-10** Total Leucocytic Count and Its Subtypes in Acute Coronary Syndrome .**Dr. Abm Abdul Aziz**, Assam Medical College, Dibrugarh, Assam, India.
7. **PP-H-11** Blood Pressure Response to Postural Change. **Masuma Zannatul Hassina**, Assam Medical College, Dibrugarh, Assam, India.
8. **PP-H-12** A Study on Quality of Life in Patients Following Myocardial Infarction .**Supriya Gupta**, Department of Physiology, Vardhman Mahavir Medical College & Safdarjang Hospital, New Delhi, India.
9. **PP-H-13** Rate Pressure Product – A Useful Tool for Evaluation of Chest Pain in Middle Aged. **Ganashree CP**, Department of Physiology, JSS Medical College, Mysore, India.
10. **PP-H-14** Interrelationship between Blood Pressure and Intraocular Pressure in Young Healthy Male Adults after Water Ingestion. **Samata Krishnarao Padaki**, S Nijalingappa Medical College, Bagalkot, Karnataka, India.
11. **PP-H-15** Hyperleptinemia and Hypertension. **Nazish Rafique**, S Nijalingappa Medical College, Bagalkot, Karnataka, India.
12. **PP-H-16** Comparative Study of QTc Interval and Change in QRS Frontal Axis During Pregnancy. **Nandini BN**, BLDEU's Shri Bmpatil Medical College, Hospital And Research Center, Bijapur, Karnataka, India.
13. **PP-H-17** Comparative Evaluation of Electrocardiographic Patterns in Different Age Groups and Sex. **Lata M Mullur**, BLDEU'S Shri B.M. Patil Medical College, Bijapur, Karnataka, India.
14. **PP-H-18** Correlation of Blood Pressure with Body Mass Index and Waist-To-Hip Ratio. **Deepak B Tambe**, Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India.

15. **PP-H-19** Electrocardiographic Changes in Normal Pregnancy. **Sunitha M**, Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India

16. **PP-I-05** A Comparative Study of Some Cardiorespiratory Parameters in Obese and Non - Obese Subjects. **Kanavi Roopa**, Rajarajeswari Medical College and Hospital, Bangalore, Karnataka, India.

17. **PP-I-06** Respiratory Function of Rice Mill Workers in Sri Lanka. **SW Wimalasekara**, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

18. **PP-I-07** A Comparative Study of Pulmonary Functions in Different Categories of Sportsmen. **Rupa Satish Doiphode**, Government Medical College, Aurangabad, Maharashtra, India.

19. **PP-I-08** Comparative Study of Pulmonary Function in Pregnant, South Indian Women at 36 weeks and Full Term Pregnancy. **Mr. Ganesh Pradhan**, Rajarajeswari Medical College and Hospital, Bangalore, Karnataka, India.

20. **PP-I-09** Assessment of Pulmonary Functions among Beedi Industry Workers - A Preliminary Study. **K Kouserbanu**, Sri Ramachandra University, Chennai, Tamilnadu.

21. **PP-I-10** A Study of the Changes in the Pulmonary Function in Coal Handling Workers after Prolonged Exposure to Coal Dust. **Yuvaraj R**, Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, Tamil Nadu, India.

22. **PP-I-11** Pulmonary Function Test in Obese Iron Ore Handling Workers. **Suganya K**, Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, Tamil Nadu, India.

23. **PP-I-12** Physiology of Alternate Nostril Breathing (Nadisodhan Pranayama): A Conceptual Review. **Kshitiz Upqdhyay-Dhungel**, KIST Medical College, NEPAL.

24. **PP-I-13** Evaluation of Pulmonary Function Tests in Patients Undergoing Laparotomy. **Nahar PS**, BJ Medical College and Sassoon General Hospital, Pune, Maharashtra, India.

25. **PP-I-14** Study of Yogic Breathing (Pranayama) on Pulmonary Function Tests in Tobacco Chewers and Non-Tobacco Chewers. **Vikas Shivajirao Shelke**, Rural Medical College, Loni, Maharashtra, India.

26. **PP-I-15** Study of Pulmonary Function Tests in Multitransfused Children with Thalassemia - A Pilot Study. **Bhagyalakshmi SS**, M S Ramaiah Medical College, Bangalore, Karnataka, India.

27. **PP-I-16** PEF Variability in Asthmatics. **Bindu Krishnan.** Sri Ramachandra University, Chennai, Tamil Nadu, India.

28. **PP-I-17** Comparison of Bronchial Responsiveness in Asymptomatic First Degree Relatives of Asthmatics and Patients of Allergic Rhinitis to Exercise with That of Healthy Controls. **Sandhya HP**, VIMS, Bellary, Karnataka, India.

29. **PP-I-18** Effect of Yoga on Exercise Induced Bronchial Lability in Asthmatic Children. **Rajani Bala Jasrotia**, Lady Hardinge Medical College And Associated Hospitals, New Delhi, India.

30. **PP-I-19** Comparison of Lung Functions in Healthy Male Swimmers and Non-Swimmers in the Age Group of 20 - 40 Years. **Deepali Annaiya P**, Sri Siddhartha Medical College, Tumkur, Karnataka, India.

31. **PP-I-20** Skeletal Muscle Function in Upper Limb in COPD Patients. **Swati Himanshu Shah**, BJ Medical College, Pune, Maharashtra, India.
32. **PP-I-21** Effect of Short-Term Practice of Yoga on Pulmonary Functions. **Gauri Makarand Apte,** Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India.
33. **PP-I-22** Effect of Hypertension on Lung Volumes. **Leena Jad**, MMIMSR, Mullana, Ambala, Haryana, India.
34. **PP-I-23** Effect of Short Term Pranayama and Meditation on Respiratory Parameters in Healthy Individuals. **Roopa B Ankad**, S Nijalingappa Medical College, Bagalkot, Karnataka, India.
35. **PP-I-24** Preliminary Study of Pulmonary Functions in Petrol-Pump Workers of Aurangabad City. **Sudhir Prabhakar Choudhari**, Govt. Medical College, Aurangabad, Maharashtra, India.
36. **PP-I-25** Study of Correlation of Serum Alpha-1 Antitrypsin (AAT) Levels and Pulmonary Function Tests in Patients Suffering from Chronic Obstructive Lung Diseases. **Deepmala Nagorao Deore,** Government Medical College, Aurangabad, Maharashtra, India.
37. **PP-I-26** Effect of Pranayama Training on Pulmonary Functions and Body Mass Index. **Pratibha Kishanrao Kalwale,** Government Medical College, Aurangabad, Maharashtra, India.
38. **PP-I-27** Shift Changes in Various Pulmonary Function Parameters in Ginning Mill Workers. **Sujata C Talikoti.** BLDEU'S Shri BM Patil Medical College Hospital And Research Centre, Bijapur, Karnataka, India.
39. **PP-I-28** A Cross Sectional Study of Lung Function Tests in Different Trimesters of Pregnancy. **Anita Teli,** BLDEU'S Shri BM Patil Medical College, Bijapur, Karnataka, India.
40. **PP-I-29** A Study of the PEFR Values in First Year Medical Students. **Anindita Mahanta**, Gauhati Medical College, Gauhati, Assam, India.
41. **PP-I-30** Habitual Cigarette Smoking Alters the Lung Function Parameters in Apparently Healthy Young Adults. **Sumangala M Patil**, B.L.D.E.U Shri BM Patil Medical College, Bijapur, Karnataka, India.
42. **PP-I-31** To Study the Effects of Ergoreflex on Respiration and Other Efferent Reflexes in Adult Male Patients with Chronic Obstructive Pulmonary Disease. **Shalini Sharma,** Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India.
43. **PP-J-06** The Effect of Combined Yoga Practice on Certain Respiratory and Cardiovascular Parameters in Young Adults. **Nooraini Bte Mahat**, Melaka Manipal Medical College, Manipal Campus, Manipal, Karnataka, India.
44. **PP-J-07** A Study of Effect of Body Mass Index and Waist-To-Hip Ratio on Cardiorespiratory Fitness in Young Males. **Vivek P,** Sri Siddhartha Medical College, Tumkur, Karnataka, India.
45. **PP-J-08** Effect of Six Weeks Yoga Training on Physical Fitness and Aerobic Capacity in Healthy Indivduals. **Nagalakshmi V**, Sri Siddhartha Medical College And Hospital, Tumkur, Karnataka, India.

DATE: 16 / 12 / 2010 TIME: 3.15 PM ONWARDS VENUE: HALL 2 ANNEXE

TOPICS: EXERCISE AND SPORTS PHYSIOLOGY (CODE – J), ERGONOMICS (CODE – K), PHARMACOLOGY AND TOXICOLOGY (CODE – L), MISCELLANEOUS (CODE – M), MEDICAL EDUCATION (CODE – N), NUTRITION (CODE – 0)

46. **PP-J-09** Oxidative Stress in Different Intensities of Short-Duration Aerobic Exercise in Young Healthy Sedentary Individuals. **Snekalatha S**, Christian Medical College, Vellore, India.

47. **PP-J-10** Muscle Endurance Testing in Sedentary Informational Technology Professionals. **Swornila A,** Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

48. **PP-J-11** Circus Artists as a Valuable Source to Prepare Skilled Athletes. **Gavkare Ajay M,** Dept of Exercise and Sports Physiology, Dr. V.M. Govt. Medical College, Solapur, Maharashtra, India.

49. **PP-J-12** The Measurement of Whole Body Endurance Using the 20-Meter Shuttle Test and Its Determinants in School Children of Seven to Eleven Years. **Rajesh Jeniton Fernando S**, St.Johns Medical College, Bangalore, Karnataka, India.

50. **PP-J-13** A Comparative Study of Physical Fitness Index and Predicted Maximum Aerobic Capacity (Vo_2max) Among the Sri Lankan Female Students and Nepali Female Students. **Tarun Kanti Sen,** Department of Physiology, Manipal College of Medical Sciences, Pokhara, Nepal.

51. **PP-J-14** Effect of Yogic Practices on the Physical Health of Young Individuals. **Rita Manoj Khadkikar**, MGM Medical College, Mumbai, Maharashta, India.

52. **PP-J-15** Regular Yoga Exercises and Nitric Oxide. **Preethi B.L**, MS Ramaiah Medical College, Bengaluru, Karnataka, India.

53. **PP-J-16** Study of Important Physical Fitness Parameters in Volleyball Players. **Taware GB,** Exercise and Sports Physiology Laboratory, Dept. of Physiology, Dr. VMGMC, Solapur, Maharashtra, India.

54. **PP-J-17** A Comparative Study of Effect of Isometric Exercise on Intra Ocular Pressure in Obese and Nonobese Young Adults. **Gowd Aruna Ramachandra**, JSS Medical College, Mysore, Karnataka, India.

55. **PP-J-18** Correlation of Handgrip Strength, Handgrip Endurance with Body Weight and Lean Body Mass in Young Male Wrestlers. **Dr. Chandrashekhar Karpoor,** SSIMS & RC, Davangere, Karnataka, India.

56. **PP-J-19** A Study of VO_2max and Plasma Lactate Values in Football Players. **Khaled Mohsin Badaam**, Government Medical College, Aurangabad, Maharashtra.

57. **PP-J-20** Cardiopulmonary Fitness in Residential and Non-Residential School Children. **Jyoti P Khodnapur**, BLDEU Shri BM Patil Medical College, Hospital And Research Centre, Bijapur, Karnataka, India.

58. **PP-J-21** Influence of Postural and Psychosocial Stresses on Work-Related Musculoskeletal Disorders and Discomfort Rating Among China Clay Mine Workers. **Amal Kumar Pari**, Suri Vidyasagar College, Suri, West Bengal, India.

59. **PP-J-22** VO_2max in Young Healthy Indian Adults. **Nitin Y**, St. John's Medical College, Bangalore

60. **PP-K-04** Implementation of Ergonomic Intervention: A Systemic Approach on Hand Muscle Fatigue and Productivity of Carpenters. **Tirthankar Ghosh,** Manipal College of Medical Sciences, Pokhara, Kaski, Nepal.

61. **PP-K-05** Effect of Gradient and Load on Cardiorespiratory Responses in Indian Soldiers during Carrying Load at Two Walking Speeds. **M.S. Pal**, Defence Institute of Physiology and Allied Sciences, Lucknow Road, Delhi, India.

62. **PP-K-06** Kinematic and Kinetic Changes of Gait during Carrying Load in Hand While Walking with Different Speeds. **Deepti Majumdar**, Defence Institute of Physiology & Allied Sciences (DIPAS, Delhi, India.

63. **PP-L-07** Alteration of Chemical Behavior of Nickel Sulfate in Combination with L-Ascorbic Acid at Different Ph Solutions in Vitro. **Shaheen A. Maniyar**, Environmental Health Research Unit, Department of Physiology, Al Ameen Medical College, Bijapur, Karnataka, India.

64. **PP-L-08** A Case Report of Phenytoin and Carbamazepine Cross-Reactivity. **Bhuvana K,** Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

65. **PP-L-09** Analysis of Emotional Reactivity and Hippocampal Morphology in Arsenic-Exposed Rats. **Sareesh Naduvil Narayanan**, Melaka Manipal Medical College (Manipal Campus), Manipal, Karnataka, India.

66. **PP-M-05** Chondrocyte Cultures in a Novel Scaffold. **Soosaimanickam Amirtham**, Christian Medical College, Vellore, Tamil Nadu, India.

67. **PP-M-06** Effect of Mobile Phone Usage on Hearing Threshold. **Ramya CS**, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

68. **PP-N-03** Adult Learning Principles: Accepting the Learning Style Differences among UG Students. **Bishnu Hari Paudel,** BP Koirala Institute of Health Sciences, Dharan, Nepal.

69. **PP-N-04** Stress Handling Potential of Students Admitted through Different Streams. **Venkatesh D**, MS Ramaiah Medical College, Bangalore, Karnataka, India.

70. **PP-N-05** Influence of Mentoring on Depression Status in First Year Medical Students. **Vijayadas Muradi,** MS Ramaiah Medical College, Bangalore, Karnataka, India.

71. **PP-N-06** Anxiety Status Assessment of New Entrant 1st MBBS Students in a City Medical College. **Anbuselvi Mattuvar Kuzhali**, Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

72. **PP-N-07** Effect of Abacus Learning on Memory in School Children. **Shanthala BN**, SSMC, Tumkur, India.

73. **PP-N-08** Sensitizing First Year Medical Students Toward Self-Directed Learning (A Simple Intervention For The Indian Scenario). **Lingaraj Jayalakshmi**, Vydehi Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India.

74. **PP-N-09** The Impact of Viva Voce Examination on Student Performance In The Theory Component Of The Final Summative Examination In Physiology. **Sharmila Torke**, Melaka Manipal Medical College (Manipal Campus), Manipal, India.

75. **PP-N-10** Outcomes of Active Learning by Modeling over Passive Learning in the Medical Profession. **Anita S Herur**, S Nijalingappa Medical College, Bagalkot, Karnataka, India.

76. **PP-N-11** Introducing Integrated Practical Examination for Endocrinology and Reproduction Module for Second Year MBBS Class. **Nazish Rafique**, College of Medicine, Saudi Arabia.
77. **PP-N-12** Admission Criteria as a Predictor of Performance in Professional Examinations. **Muhammad Ayub**, Ayub Medical College, Abbottabad, NWFP, Pakistan.
78. **PP-N-13** Importance of Physiology Subject in PBL Based Integrated Curriculum. **Prof. Syed Tousif Ahmed**, Ziauddin Medical College, Karachi, Pakistan.
79. **PP-N-14** Factors Causing Anxiety and Affecting the Performance of Medical Students in Professional Exams. **Muhammad Asif Memon**, Ziauddin Medical College, Karachi, Pakistan.
80. **PP-N-15** Evaluation of Objective Structured Practical Examination And Traditional Practical Examination in Physiology. **Sultana Ferdousi**, BSMMU, Dhaka,
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SCIENTIFIC SESSIONS

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Invited Lectures
Abstracts

IL 01

Is Whole Body Physiology Relevant in the Post-Genomic Era?

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Many of the important developments in physiological sciences in the 20th century have been contributed to by experimental investigations on whole body systems. These include the contribution of physiology to understanding the human body's responses to changes in environmental temperature, high altitude including space physiology, metabolic and other adaptations to deficiencies and excess, etc. While our understanding of physiological systems evolved in the last century, the central tenet that emerged was the concept of unity of the various systems of the body and the study of physiology centred on the quest to understand how the various components of the organism worked together to maintain the healthy normal state. This quest culminated in the coining of the term 'homeostasis' by Walter Cannon to describe the self-regulating processes by which biological systems maintain stability. In the post-genomic era, the pursuit of a reductionist view rather than an integrated approach has undermined the continued development of holistic approaches not only in physiological sciences, but in science in general. Whole body human physiology and the experimentation on human subjects has been affected by this shift. Human experimentation is further challenged by the large biological variability imposed both by genes and the environment, the need for adequate sample sizes and from ethical considerations. The grand challenge faced by contemporary physiology in the post-genomic era will be to integrate the deluge of information arising from in vitro studies into a coherent understanding of physiological function in vivo and its application to the maintenance of good health in man.

IL 02

Neuroprotection by BH in Experimental Epileptogenesis

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Epilepsy is one of the most common neurological disorders and a large number of populations all over the world are suffering from this particular disease. BH fruit was chosen for the study because of its potent pharmacological activities, low toxicity, economic viability and its wider use in common people. In the present study, we have attempted to make a detailed investigation regarding the CNS depressant and anti-convulsant action of BH by using three different experimental epileptic rat models (Penicillin – induced (Grandnial), Pentylenetetrazole – induced (Petitmal) and Amygdala Kindling model (Focal). The overall purpose of this study is to prepare and investigate the anti-epileptic property of aqueous BH fruit extract. We have studied Behavioural (Open field test, Rotarod test, Pentobarbitone induced sleeping time and Seizure scoring), Electrophysiological (EEG) and Biochemical (Neurotransmitters such as serotonin, dopamine and norepinephrine, Antioxidants such as SOD, CAT & GSH and Lipid peroxidation) parameters for evaluation. The results of the study clearly demonstrated a potent anticonvulsant property of BH against the development of epileptogenic changes in different experimental epileptic rats. The behavioural signs shown by the experimental rats pretreated with aqueous extract of BH at a dose of 400mg/kg b.w. for 14 consecutive days indicated overall depression of CNS activity as revealed by decreased locomotor score, gripping time and increased PB-induced sleeping time. BH also decreased the severity of behavioural score. The electroencephalographic changes and monoamine level in different brain areas also suggest the protective effect

of BH. The potency of BH as an anticonvulsant agent against experimental epileptogenesis is comparable with that of Diazepam, a conventional antiepileptic drug.

IL 03

Physiology Fluxomics and Fetal Growth and Programming

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IL 04

Thyroid Physiology Under the Influence of Tea Flavonoids

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Background: Tea is a rich source of polyphenolic flavonoids including catechins that are thought to contribute to the health benefits of it. Flavonoids have been reported to have antithyroid and goitrogenic effect.

Objective: The purpose of this study was to evaluate whether green and black tea at relatively high doses have any harmful effect on thyroid physiology.

Study Design/Methods: In *in vivo* experiments, un-fractionated green and black tea extracts were administered orally to adult male albino rats for 30 days at doses of 1.25g% (≡5 cups), 2.5g% (≡10 cups) and 5.0g% (≡20 cups), whereas *in vitro* study, green and black tea extracts were administered in isolated thyroid tissues at a concentration of 2.5, 5.0 and 7.5 mg/ml.

Results: The results showed that green tea extract at 2.5g% and 5.0g% doses and black tea extract only at 5.0g% dose have the potential to alter the thyroid gland physiology and architecture i.e. enlargement of thyroid gland as well as hypertrophy and/or hyperplasia of the thyroid follicles and inhibition of the activities of thyroid peroxidase and thyroidal, hepatic and renal 5'-deiodinase I with elevated thyroidal Na+,K+-ATPase activity along with significant decrease in serum T3 and T4, and a parallel increase in serum TSH. However, *in vitro* study shows the similar observations in the activities of thyroid peroxidase and 5'-deiodinase I after both tea exposure, only the activity of thyroidal Na+,K+-ATPase remain unaltered even in high concentration of both tea extracts.

Conclusions: Taken together, the present study reinforces the concept that tea flavonoids i.e. catechin might behave as antithyroid agent and possibly the chronic consumption could alter thyroid function. This study concludes that goitrogenic/antithyroidal potential of un-fractionated green tea extract is much more than black tea extract because of the differences in catechin contents in the tea extracts.

IL 05

Applied Physiology of Singles Badminton

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Badminton is a most popular game not only in the whole world, but also in Asian countries from where most of the World Champions emerged. Development of a sport as well as the players involved in that sport depends mostly on the scientific work carried out on the sport

event. Most scientific works in badminton have been performed in biomechanics and in physiology. The physiological demand of a game can be studied from the response of heart rate and blood lactic acid of the players in the game and in specific training. During a singles game, the heart rate of the players varies from 160-200 b/min and the blood lactic acid from 3-5 mMol/L. The physiological demands in badminton can be compared with field hockey, soccer, and amateur boxing, on the basis of heart rate. But, unlike other sports, the response of blood lactic acid is not very high, because of the rest pauses in between the rally in a game. The duration is also less as compared to other games. The ratio of work and rest pause in badminton is close to 1:2. Some of the lactic acid accumulated in the blood during activity, are utilized during the rest pauses. The analysis of the game reveals that the players should be able to tolerate an average heart rate of 170 b/min and a blood lactic acid concentration of 4 mMol/L throughout the game. Training in badminton is more intense than playing the game. Scientific studies showed that the heart rate varied from 82% - 100% of the maximum, during on the court specific training. Specific training of various types on the court in badminton is very speedy and intensive. The blood lactic acid concentration showed values of 8 – 12 mMol/L. In these types of specific training on the court, the movements start from the middle of the court of a side to the different corners of the court, while executing various strokes. Sometimes, the training is also administered without the shuttle (shadow practice).

Scientists have estimated that 60 - 70% of the energy yield during badminton play is derived from the aerobic system in combination with oxygen, while 30% comes from the anaerobic systems. Badminton players work at a high percentage of their maximal aerobic capacity (VO_2max), work at or very close to maximum heart rate (especially in singles) but have only a moderate energy yield from the anaerobic lactic system (low blood lactic acid). In the current era, it appears elite badminton singles players possess well-developed aerobic systems (VO_2 max figures for males >60 ml/kg/min; for females > 55 ml/kg/min). These figures correspond to the equal aerobic capacity of the soccer, field hockey players and the middle distance runners. The Chinese Badminton players and most of the European badminton players possess the same value. The Indian badminton players exhibit a little low but are comparable (58 and 55 for male and female) aerobic capacity. The above scientific studies reveal that the badminton players must possess a high aerobic capacity. The players must be able to play at an intensity of near maximal heart rate (80 – 100 %) throughout the game. The players should also be able to tolerate a high intensive training schedule where the blood lactic acid concentration is 9 – 12 mMol/L.

IL 06

Role of pro-inflammatory cytokines in the development of angiotensin-II induced hypertension.

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Hypertension is considered as a low grade inflammatory condition induced by the presence of various pro-inflammatory cytokines, including tumor necrosis factor-alpha (TNF-α). Recent studies have implicated an involvement of TNF-α in the development of salt-sensitive hypertension induced by angiotensin II (ANGII). To understand further the relationship between TNF-α and ANGII, our laboratory examined the renal and systemic responses to ANGII administration in TNF-α knockout (TNF-α KO) mice in a series of both acute and chronic studies and compared these responses to those in wild type (WT) mice. Chronic infusion of ANGII at a rate of 1 mg/kg/min for 2 weeks with implanted osmotic mini-pumps, caused increases in mean systemic blood pressure

(SBP) in WT but not in TNF-α KO mice. Cardiac hypertrophy induced by ANGII observed in WT mice was significantly attenuated in TNF-α KO group. In another group of TNF-α KO mice in which replacement therapy was made with recombinant TNF-α, ANGII caused similar increases in SBP and in cardiac hypertrophy as in WT mice. TNF-α KO exhibit lower urinary excretion rates of nitric oxide metabolites, nitrite/nitrate ($U_{NOx}V$) and the oxidative stress marker, 8-isoprostane ($U_{ISO}V$) compared to those observed in WT. Acute administration of ANGII in anesthetized TNF-α KO mice resulted in a lesser degree of reduction in renal blood flow (RBF), an increase in glomerular filtration rate (GFR) and a lesser degree of increases in $U_{NOx}V$ and $U_{ISO}V$ compared to that in WT. Preliminary studies in our laboratory demonstrated that when ANGII was administered at a subpressor dose (25 ng/min) for 2 weeks in endothelial nitric oxide synthase knockout (eNOS KO) mice, there was a high mortality rate (~80%) associated with marked inflammatory changes in renal tissues compared to that observed in wild type (WT) mice. Co-administration of tempol markedly improved the survival rate (<10% death) and also ameliorated these changes in renal parenchyma in eNOS KO mice treated with ANGII. Thus, these results suggested that a functional eNOS activity provides an essential protective role against the injurious effects of AngII induced oxidative stress. Both AngII and TNF-*a* have been shown to upregulate tissue NOS and NADPH oxidase (Nox) protein expressions and activity. To evaluate further the role of TNF-*a* in AngII induced hypertension, a low dose (10 ng/min; to reduce mortality rate) of AngII was administered chronically for 2 weeks by osmotic minipump in eNOS KO with or without co-administration of a TNF-α receptor blocker, etanercept (1 mg/kg i.p. every 3rd day) and compare the responses to those observed in WT mice. Ang II infusion at this low dose caused a small increase in SBP in WT but caused a marked increase in eNOS KO mice. Co-treatment with etanercept ameliorated this hypertensive response in eNOS KO mice. AngII induced increases in renal tissue mRNA expression of TNF-α as well as Nox proteins was markedly attenuated in etanercept co-treated eNOS KO mice. These data suggest that TNF-α generation and its consequent enhancement of Nox activity in the kidney mainly contributes to the development of ANGII induced hypertension in eNOS KO mice. Acute administration of human recombinant TNF-α in anesthetized WT mice also resulted in decreases in RBF and GFR but interestingly induces increases in urine flow and sodium excretion. These responses were not seen in animals pretreated with a TNF-α blocker, etanercept (5 mg/kg, ip). Pretreatment with tempol (2μg/gm/min) also attenuated the decreases in RBF and GFR but the renal excretory responses to TNF-α remained unaffected. These results suggest that superoxide production mediates the renal vasoconstrictor effect of TNF-α while the natriuretic effect may be due to direct inhibitory action of TNF-α on epithelial sodium channel (ENaC) as suggested by many in-vitro studies reported earlier. Collectively, these data indicate that TNF-α involves in mediating the changes in renal hemodynamics and excretory function as well as nitrosative and oxidative stress induced by ANGII and thus, plays a mechanistic role in the development of ANGII dependent hypertension.

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IL 07

The Physiological Society GL Brown Lecture 2010

Seeing is Believing! Imaging Ca^{2+}-Events in Living Cells

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I will present a brief historical overview of the evidence supporting a signalling role for intracellular [Ca^{2+}] in

almost every tissue studied. High speed, confocal Ca^{2+}-imaging has now revealed subcellular detail not previously apparent, with the identification of Ca^{2+}-sparks. These act as building blocks for larger transients during excitation-contraction coupling in cardiac muscle but their function in smooth muscle appears more diverse, with evidence suggesting both 'excitatory' and 'inhibitory' roles. Sparks can activate both Ca^{2+}-sensitive Cl^- and K^+ currents, which exert positive and negative feedback on global Ca^{2+}-signalling, respectively, through changes in membrane potential and activation of voltage-operated Ca^{2+}-channels.

I will present data from studies of Ca^{2+}-signalling in the smooth muscle of retinal arterioles. These were mechanically isolated from rat retinas, and loaded with fluo-4AM to allow Ca^{2+}-imaging. Stimulation with the constrictor endothelin 1 (Et-1), which results in a graded increase in average $[Ca^{2+}]$ when recorded with fura-2, stimulates much higher frequency Ca^{2+}-oscillations in individual smooth muscle cells, suggesting a frequency modulated, rather than amplitude modulated signal. These oscillations are asynchronous, so increased phasic activity at the cell level would favour a graded increase in resistance at the whole vessel level. This also suggests that the differences between tonic and phasic smooth muscle are more related to differences in intercellular coupling than differences in signalling at the cellular level.

We have also shown that feedback via Ca^{2+}-activated conductances is important, particularly positive feedback via Ca^{2+}-activated Cl^- channels. Blocking these channels with DIDS abolishes the effects of Et-1 on oscillation frequency and amplitude. Inhibiting Ca^{2+}-activated K^+-channels with iberiotoxin had a much smaller effect, increasing oscillation amplitude. The physiological relevance of these effects were tested *in vivo*, using a confocal scanning laser ophthalmoscope to record retinal arteriolar diameter and blood flow in anaesthetised rats. Intravitreal injection of Et1 (but not vehicle) caused vasoconstriction and reduced flow. These effects were completely inhibited by DIDS but were unaffected by iberiotoxin. This suggests that activation of Ca^{2+}-activated Cl^- currents plays an important part in Et1 signalling *in vivo*.

Rapid linescan imaging of isolated arterioles also revealed the presence of brief Ca^{2+}-sparks in retinal arteriolar myocytes. These could summate to produce prolonged Ca^{2+}-oscillations associated with myocyte contraction, suggesting an excitatory role in this tissue. We tested this further by investigating what effect drugs known to inhibit sparks had on myogenic tone in pressurised arterioles. Development of tone was associated with an increase in spark activity and inhibition of sparks with ryanodine or tetracaine led to vessel dilatation. Use of cyclopiazonic acid to deplete the sarcoplasmic reticulum store caused a biphasic mechanical response, with a transient contraction lasting <30s, followed by sustained dilatation. This correlated well with cyclopiazonic acid's effects on spark activity, which is transiently increased but then remains suppressed until the drug is washed out. These results are the opposite of those reported in larger arteries and appear to confirm that sparks play a functionally excitatory role in retinal arterioles. Whether these effects are tissue specific or reflect a general difference between arterioles and larger vessels remains unclear.

Acknowledgments: Fight for Sight, The Wellcome Trust, The Juvenile Diabetes Research Foundation (US), The Physiological Society.

IL 08
Phenotyping of Sleep Disordered Breathing

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The application of genetic information to specific disease processes depends in part on the accurate phenotyping of the patients from which the genotype is obtained. Obstructive Sleep Apnoea (OSA) is caused by collapse

of the pharyngeal airway, producing apnoea with associated intermittent hypoxia and sleep disruption. The cardinal symptom of OSA is profound daytime sleepiness. There is also a well recognised link with cardiovascular disease and a reduction in cognitive function. The health burden and economic consequences of these impairments are considerable since OSA syndrome is the third most common respiratory disorder, after asthma and chronic obstructive pulmonary disease, affecting 4% of middle aged males, and 2% of females in a USA community based study, and between 3 - 8% in Indian population studies.

Phenotyping OSA poses particular problems. Measurement of sleepiness can be unreliable and overnight sleep studies are time consuming and complex. Therefore they do not lend themselves to the wide scale studies require for genotyping. Moreover, phenotypic expression of the genotype is closely linked to environmental factors. This is a issue when studying OSA since the key risk factor for OSA is obesity, with up to 90% of OSA patients presenting with morbid obesity (BMI >30 Kg/m^2).

Characterisation of the OSA physiological phenotype may be carried out by assessing the wake to sleep changes in ventilatory control, together with upper airway structure. In some people the sleep-related reduction in hypercapnic chemosensitivity may be as much as 50% but there is considerable between subject variation which is likely to have an impact on the ability to maintain stable breathing during sleep. The ventilatory compensation to an increase in upper airway resistance also varies between individuals. Sleep onset results in an increase in pharyngeal resistance, caused by a reduction in tonic activity of the pharyngeal dilator muscles. In healthy non-snoring people, upper airway resistance increases by approximately 3 cm $H_2O/l/s$ whereas in people who snore, it can increase up to 50 $cmH_2O/l/s$. Moreover, during wakefulness, application of an experimental resistive load is compensated for by an immediate increase in inspiratory time; this does not occur during NREM sleep. Such incomplete load compensation contributes to the sleep-related hypercapnia in snoring subjects, and in some cases causes OSA. When obstruction of the airway occurs, it is usually accompanied by a compromised upper airway anatomy. This underlying predisposition to airway collapse can be assessed with structural imaging.

It is anticipated that the post genomic era will lead to individualized medical care, improved diagnostic testing and better treatment options. In the case of OSA, physiologists have a vital role to play in defining the phenotype. To date OSA appears to be a polygenetic disease without a consistent phenotype.

IL 09

The Neuroendocrine Programming of Sex Difference in the Brain

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Strong gender biases in the frequency and intensity of neurologic disorders and neuroendocrine function compel us to understand the origins of sex difference in the brain and reveals novel signaling pathways and cellular mechanisms. In the laboratory rodent it is well established that gonadal steroids act on the bipotential brain during a perinatal sensitive period to permanently organize the neural substrate into a masculine or feminine phenotype. What have been missing is the cellular mechanisms by which steroids achieve this end especially when exposure to exogenous agents may occur during the critical period of brain sexual differentiation. Several principles are beginning to emerge, including that the effects of steroids and psychotrophic drug on the developing brain are highly region specific. Recent research highlights an unexpected role for psychotrophic drugs in several brain regions and the importance of cell-to-cell communication in permanently altering the synaptic pattering of specific brain regions. Permanent sex differences in adult sexual behaviour and neuroendocrine functions are the result of exposure to

psychotrophic drug, morphine at the critical time of brain sexual differentiation.

Understanding the mechanistic basis of hormonally-mediated sex differences in the brain opens new avenues of gender-specific prevention and intervention in the treatment of complex neurodevelopment disorders including autism, schizophrenia, dyslexia and several neuroendocrine functions. By comparing and contrasting the regional mechanisms we can begin to generate a unified view of how the brain is constructed to optimally serve the needs of each sex.

IL 10

Signal Molecules in the Hypothalamus Controlling GnRH Release

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IL 11

'Ethics and Empathy in Medical Education'

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IL 12

'Amyotrophic Lateral Sclerosis (ALS) – What can an Animal Model Reveal?

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Understanding the etiopathogenesis of sporadic ALS (SALS) is more challenging than the familial form (FALS). To delineate the pathogenesis of SALS, we have studied the effect of CSF from SALS patients (ALS-CSF) on rat spinal cord and motor cortex. ALS-CSF induced degenerative changes in the motor neurons and affected the astrocytes. Reduced number of choline acetyl transferase positive spinal motor neurons with aberrant phosphorylation of neurofilaments, fragmentation of Golgi apparatus and enhanced LDH activity were amongst the prominent observations. Reduced expression of trophic factors indicated an altered microenvironment. The expression of sodium and potassium channels on spinal motor neurons was significantly diminished. Alongside, the local field potentials recorded from adult rat motor cortex showed a bimodal effect on the relative power values. These changes were validated by an overt motor behavioral deficit on rotarod and grip strength. Apart from motor neurons the glia were also affected. Reactive astrogliosis and reduced glial glutamate transporter-1 expression accompanied transformation of flat to fibrous astrocytes. Degenerative changes were also seen in NSC-34 cells (an established motor neuron cell line) following exposure to ALS-CSF. We are planning to use NSC 34 cells as a bioassay model to isolate the toxic factors present in the ALS-CSF. Our all-inclusive study using a rat model reports the effect of ALS-CSF on motor neurons at the molecular, cellular, physiological and behavioral levels. However, the motor neuron degeneration is resultant of several dysfunctional pathways and we may still have a long way to go after two decades of dabbling with the complexity of motor neurons.

IL 13

Genetic Analysis of Animal Physiology in the Post Genomic Era

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The complete sequencing of the human genome in 2001 marked a watershed in the range of experimental

approaches available to understand physiological mechanisms in human health and disease. While the availability of genome sequence allowed computational prediction of the complement of proteins that are likely to subserve the cellular and molecular mechanisms involved in human physiology, it also provided a number of surprises and challenges (a) Despite being substantially larger in size, the human genome encodes only twice as many protein coding genes compared to those in the worm and fly. (b) It revealed the existence of a number of genes where the function encoded proteins was not apparent. (c) It raised challenges of devising experimental paradigms that could reveal the function of such proteins in human physiology.

Along with the sequencing of the human genome, the genomes of a number of other experimentally tractable model organisms such as the worm C.elegans, fruitfly D.melanogaster, zebrafish D.rerio and the mouse M.musculus were also determined. These genome sequences revel a remarkable degree of conservation of encoded proteins with the human genome. Thus these model organisms offer an opportunity to experimentally address the molecular basis of physiological processes that are conserved in the animal kingdom. I will discuss these issues using examples from our own work (using the fruitfly Drosophila as a model system) on the TRP superfamily of ion channels, proteins with an evolutionarily conserved role in sensory physiology.

IL 14

Cognitive Performance During Onscreen Reading: Effect of Font Type and Size

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Reading is a complex perceptual and cognitive process. We are experiencing a transition of media from the printed paper to the computer screen. These days people spend more time on using and reading text on computer screen than printed paper. This evolution is modifying the process of how we read and understand a text. As reading involves both perceptual and cognitive inputs, it is not surprising that several visual and linguistic characteristics of text have been shown to affect reading. Font type and size characteristics play an important role in understanding the complexities of visual information in human-computer interface. Throughout the world, researches have not been able to define any standard font size and type to facilities better readability for computer operators. A detailed investigation of the effect of font type and size on cognitive performance during reading on computer screen has been carried out by using subjective, objective and physiological evaluation method on young Indian adults.

A group of postgraduate researchers, 25to 35 yrs volunteered for this study. Two types of font were used, Serif and Sans serif fonts. Serif font included Times New Roman (TNR), Georgia and Courier New. Sans serif fonts included Verdana, Arial and Tahoma. All these fonts were presented in 10 point, 12 point and 14 point sizes. This study used a 6 x 3 (font type x size) within-subjects design matrix. Subjects read 18passages (18 font type and size combinations) of approximately the same length and reading level written in black on white background on a 17" TFT LCD monitor one after another. Reading time for each passage was recorded. Subjects ranked the font conditions for general preference on a seven point scale. Overall mental workload was measured by NASA- TLX questionnaires. Eye movements were recorded by a binocular eye movement recorded. Readability in terms of time was better for Serif fonts than Sans serif and reading time was minimum for Courier New 14 point. However, Sans serif fonts were preferred more than Serif fonts. Subject's ranking was highest and overall mental workload was least for Verdana 14 point. Pupil diameter, mean fixation duration and total gaze duration were least for Courier New 14 point.

Present study showed that the Courier New 14 point sized font can be read on computer screen faster with reduced cognitive load compared to other fonts studied. For onscreen presentation purpose Verdana font is a better choice out of all the six fonts studied.

Keywords: Font type; size; reading on screen; young individual; cognitive workload.

IL 15

Physiology Teaching in India: Some Problems & Prospects

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Background

It is some times criticized that the Universities and Medical Colleges of India are producing graduates and post-graduates in Physiology who are not well equipped to tackle the social needs or solve the problems in respect of physiological, nutritional and health problems.

Objectives

There is increasing social demands for the accountability, transparency, better service and quality assurance among the physiologists and health professionals. The main objective of the paper is to highlight the problems of Teaching of Physiology, especially under Basic Science Faculty and also under medical faculty in India since 1900 till date and to suggest some measures for solving the problems.

Study Design

Some problems in respect of curriculum of physiology, teaching and learning processes, assessment system, student selection process, method of teacher selection, student teacher ratio, training and continuing education of teachers, infrastructure have been discussed.

Results & Conclusion

The future prospects of physiology along with some suggestion for solving problems have been highlighted.

Oration Lectures

OL1

Professor P.B. Sen Memorial Oration

Endogenous Modulators in the Regulation of Ion Transporting Enzymes : A Historical Account, Recent Developments and Future Perspectives

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Ion transporting enzymes, known as specific pumps, are responsible for the transport of various ions across cell membranes. A prerequisite for life is the ability to maintain electrochemical imbalances across biomembranes. In all eukaryotes, the plasma membrane potential and secondary transport systems are energized by the activity of P-type ATPase membrane proteins. Malfunction of pumps leads to various cell disorders and subsequently diseases like cardiac problems, kidney disorder, diabetes, cataract, even cancer. Their activities/ functions are regulated either by exogenous compounds/agents/drugs or by endogenous substances like proteins, peptides, hormones, etc., which are collectively known as modulators. Some of these endogenous modulators may be useful for developing drugs depending on the nature of regulation. For more than last twenty years researchers across the globe are working on different endogenous regulators of these ion transporting enzymes with the aim of understanding the mechanism of regulation and subsequently of developing drugs. In the presentation, regulation of ion transporting enzymes, commonly known as ATPases e.g. Na^+,K^+-, Ca^{2+},Mg^{2+}-, Ca^{2+}-, H^+,K^+-ATPases, by a number of endogenous modulators have been described.

OL2

BB Sarkar Oration

Human Variability and Nutrition: –Omics Sciences and Whole Body Physiological Approaches in Health and Disease

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Human beings are different and variable within the spectrum of health, and this also impinges on a very individual response to environment and the risk for the development of disease. Phenotypic metabolic differences among humans are determined by extensive biological variation in each person's genotype, their exposures to environment and the interaction between genotype and environment. Physiological approaches to nutrition, in defining, for example, nutritional requirements, try to work through recommendations that are reductionist in principle, with an acknowledgement toward variability, such that a single number might suffice for an entire population, in what is called a 'safe' requirement. However, it is quite unlikely that with variability as it exists, that any dietary recommendation would remain similar across the entire population. While this approach works in deprived populations to ensure policies that provide for adequate intakes, it is apparent that as we move toward more food security, the single number requirement approach needs more, and upper limits of intake are being defined for nutrients where data are available.

There is a need for personalized approaches, within the realms of practical possibility. Physiology has never been more relevant than now, and the development of systems biology is revolutionizing the study of human health and its interaction with the environment. Systems biology is the analytical approach to relationships between the elements of a system, which could be from

molecules to cells to the whole body, and uses several analytical approaches ranging from physical to chemical and biological methods. The omics approach now encompasses many different approaches, ranging from the genome to the metabolome. These approaches offer a wealth of individual information, but one might need to characterize the individual in a more integrated fashion. In the future, these omics applications, genome to whole body, should be able to titrate, in vivo, the characteristics of the body and its response to environmental stress or infection, so that new approaches to individualized nutrition can become possible.

OL3

Dr. (Mrs.) Chitralekha Mukherjee Memorial Oration

Protective Efficacy and Immunogenicity of a Live Transconjugant Hybrid Strain of *Shigella Dysenteriae* Type 1 in Animal Models

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Bacillary dysentery caused by *Shigella* species, is a major cause of infant morbidity and mortality in developed as well as in developing countries. At present, only antibiotic therapy is available for treatment of shigellosis. Unfortunately, due to the global emergence of multidrug resistance, the choice of antimicrobial agents for treating shigellosis is very limited and we are approaching a situation where shigellosis is becoming an untreatable disease because of lack of an effective antibiotic. Therefore, the possibility of other preventive measures such as a vaccine against shigellosis has attracted increasing attention in this field. Various trials of several candidates' vaccine are done in different parts of the world, but till date no suitable *Shigella* vaccine is available for public health use. There are different serotypes of *Shigella* species and their distribution varies between endemic geographical regions. In our earlier studies we constructed a hybrid strain of *Shigella dysenteriae* type 1 by introducing a plasmid vector pPR1347, carrying both the *rfb* gene cluster and the *rfc* gene of *Salmonella typhimurium*. After introduction of a lipopolysaccharide biosynthesis gene, virulent *Shigella dysenteriae* type 1 strain became avirulent. After successive oral immunization, the protection following challenge was 100% protection in the immunized group where as the unimmunized group of animals developed dysentery. Serum IgG and IgA titers showed exponential rise during oral immunization. Histology of the colonic biopsy samples, immunoblot assays against whole cell lysate, lypopolysaccharide and outer membrane protein strongly supported the mounting of a vigorous immune response following oral immunization. This transconjugant hybrid shigellae strain could be a useful vaccine candidate in the future.

Key words: *Shigella Vaccine,* Oral immunization, Protective efficacy, Animal model.

Symposium Lectures

Symposium on 'Physiology in Unusual Environments'

SL1
Man In Thermal Environment

Wg Cdr D K Dubey
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Humans live their entire lives within a very small protected range of internal body temperatures. The maximal tolerance limits for living cells range from about 0° Celsius (ice crystal formation) to about 45 ° Celsius (thermal coagulation of intracellular proteins). To maintain internal temperature within these limits, people have developed very effective and in some instances specialized physiological responses to acute thermal stresses. By far, the largest source of heat imparted to the body results from metabolic heat production *(M)*. Heat can also be gained from the environment via radiation *(R)* and convection *(C)* Under cool to thermoneutral conditions, heat gain is balanced by heat loss, no heat is stored, and body temperature equilibrates. Core temperature () represents internal or deep body temperature, and can be measured orally, rectally or, in laboratory settings, in the oesophagus or on the tympanic membrane (eardrum). The temperature of the shell is represented by mean skin temperature. The site of greatest thermoregulatory control in an area of the brain known as the pre- optic/anterior hypothalamus (POAH). When body temperature rises above "set point" temperature, effector responses associated with cooling (sweating, increasing skin blood flow) are turned on. When body temperature falls below the set point, heat gain responses (decreasing skin blood flow, shivering) are initiated. The term 'thermal comfort' describes a condition of mind which expresses satisfaction with the thermal environment and is usually referred to in terms of whether someone is feeling too hot or too cold. The range of environmental and personal factors deciding comfort level makes up what is known as the 'human thermal environment'.

The multiple conditions in which the humans are exposed to hot thermal environments of concern include the high temperature areas like the deserts, hot humid tropical shores, enclosed buildings without air conditioning or other control systems, heavy machinery operations in closed and open fields, armoured tanks, interior of cockpits and the open tarmac and hangars of aircrafts, submarines, deep sea diving, mining, drilling, sports events like long distance running, field games under hot sun, work environments of laboratories, and within the confines of ones home including the kitchen and attic etc. Exposure to cold would be in the case of high altitude mountains, deep sea diving, temperate and polar region operations, factories and occupations involving cold rooms, deep freeze storage etc.

Thermal comfort is defined for whole body and local. A useful tool for describing, designing and assessing thermal environments is the 'thermal index. A comprehensive thermal index will integrate the factors of radiant temperature, air velocity, humidity and the clothing and activity of the individual to provide a single index value. These indices are divided in to three types namely rational, empirical and direct. Some of the rational indices include the Predicted Mean vote, Predicted percentage of thermally dissatisfied persons etc. Empirical indices include the Effective temperature and corrected effective temperature. Bedford and modified ASHRAE 7 point scales are also used to define thermal comfort. Heat stress indices both empirical and theoretical provide the means of assessing hot thermal environments to predict the effect on people. Empirical indices include the Wet Bulb Globe Temperature, (WBGT), Physiological heat exposure limit (PHEL). Other indices include the Oxford Index, Predicted 4

hour sweat rate, Effective and corrected effective temperature, Wind Chill Index, Still Shade Temperature, Required Clothing Insulation etc Rational indices include required evaporative sweat loss, maximum evaporative sweat loss, the Heat Stress Index, Index of Thermal Stress. The most appropriate index or indices taking in to account all the relevant environmental conditions should be used for defining the environment. The primary object of the analysis of results of these indices is to determine whether the thermal environment is acceptable or if the occupants suffer from discomfort or serious deleterious effects of heat or cold stress. To achieve this aim the suitable stress or comfort index should take into account all the relevant factors like the environment, clothing, work rate and physiological conditions of the personnel.

Precautionary measures including environmental control, selection of persons fit to work in the environment with monitoring, reduction of the work period by work/rest regime, and use of conditioned or protective clothing form part of the strategy to combat the thermal stress. Heat and cold injuries have to be identified and appropriate preventive and therapeutic measures have to be executed at the earliest. The workplaces have to be practically assessed for understanding the problems of thermal stress. Protective measures in the form of engineering measures, personal protective measures and specific steps to deal with unique situations have to be implemented. The performance and productivity of the individual are affected by the heat and cold stress. Acclimatization levels and skill and training requirements for specific environments have to be considered before employment in thermally stressful areas. Risk assessment of the conditions need to be performed judiciously before tasking the person in the hazardous hot or cold areas. The various medical conditions due to heat stress including heat oedema, heat syncope, heat exhaustion, heat stroke, hyperventilation and dehydration need to be recognised and managed effectively. Adequate fluid and salt intake forms the basis of all these therapeutic strategies. Supervision, medical screening, acclimatisation and use of drugs form the cornerstone of therapy.

SL2
Man in Hyperbaric Environment

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Most humans are physiologically adapted to live and work near sea level, where ambient pressure is 1 atmosphere absolute (ATA). Nonetheless we survive during Space Shuttle extravehicular activity by wearing a 4.3lb./in. 2 absolute pressure suit (30,300 ft. pressure equivalent, 0.29 ATA), down to the summit of Mt. Everest at 29,029 ft., where pressure is 0.31 ATA to ocean depths as great as 2,300 ft. of sea water (fsw), where pressure increases to 70 ATA . Human exposure to the challenges of the underwater world has been traced back thousands of years. Examples of hyperbaric environments are patients and medical attendants undergoing hyperbaric O_2 therapy (HBOT), diving with an underwater breathing apparatus for recreational and professional (oil and salvage companies), combat purposes, simulated dry and wet dives for hyperbaric research and dive training and working in the compressed atmosphere of a subterranean environment.

Hyperbaric environments present many physiological challenges, affecting especially the lungs, hollow viscera, and nervous system and are due to pressure (depth), temperature extremes, and the unbreathable ambient medium. They affect locomotion, respiration, circulation, renal and nervous systems, and water and thermal balance due to the physical properties of water. Common problems associated with hyperbaric environments included barotraumas, O_2 toxicity, N_2 narcosis (inert-gas narcosis), CO_2 toxicity, and high-pressure nervous syndrome (HPNS) and the well known Decompression sickness. Barotrauma refers to injury caused by changes in pressure.

Divers are exposed to both heat and cold and individuals may suffer serious hypothermia. Even in peacetime, divers work with explosives and may be exposed to underwater blast. Blast is more dangerous in water than in air. The introduction of compressed air and artificial gas mixtures extend diving range and duration but also create problems related to inert-gas effects and rapid ascent to the surface. Fortunately, these problems can be avoided by correct use of diving equipment and implementation of staged decompression to allow gradual de saturation of tissues without bubble formation.

If the diver ascents from the bottom to the surface too rapidly, inert gases stored in the tissue form bubbles in the blood and tissues. The intravascular bubbles cause tissue ischemia and necrosis. These phenomena are gathered in the concept decompression sickness. The main problems are caused by bubbles blocking the blood supply. Pains occur in the muscles and in the joints (bends). Life-threatening bubbles may block the pulmonary capillaries, which trigger thoracic pain called chokes with dyspnoea, pulmonary oedema and often death. The CNS symptoms and signs are dizziness, paralysis, collapse and unconsciousness. The ascent from deep dives must be slow and systematically in stages. Stage decompression, according to decompression tables, prevents decompression sickness in the majority of seemingly healthy persons. Stage decompression with a rate below 18 m per min between stages, allows most people to ascent without decompression sickness (bends, caisson disease). The limit for compressed air diving should be 50 m (150 feet). Rational therapy requires immediate recompression in a pressure chamber, where sufficient pressure can be established to eliminate the bubbles causing the disease. The nitrogen gradient from the divers body to the air in the decompression tank is increased with oxygen enriched air for rapid removal of nitrogen from the body.

Diving at great depth (80-300 m) makes it necessary to live in large habitats at depth for longer periods. These divers are saturated with the inert gas (He, Ar etc) to which they are exposed, and this type of diving is termed saturation diving. Helium is used together with a small O2 fraction, in order to avoid acute O2 poisoning. At 200 m of depth only 1% O2 is necessary in the helium-oxygen mixture (so-called heli-ox-mixture).

Dives deeper than 50 m are performed with helium instead of nitrogen as the inert gas. The advantages of helium is a low solubility coefficient in the tissues, a low narcotic-toxic effect, a rapid diffusion rate out of the tissues, and a minimal airway resistance due to its low density.

Rapture of the depth - or nitrogen narcosis - appears at 40 m when breathing compressed air. The diver becomes euphoric with behaviour similar to alcoholic intoxication. The inert gas narcosis increases in intensity with depth according to Martini's law: Each 10 m of diving depth changes the behaviour as much as one drink. Therefore, the limit for compressed air diving should be 50 m.

Active oxygen or oxygen free radicals (such as the superoxide O2- and hydrogen peroxide) are continuously produced in the mitochondria from the dissolved oxygen. As long as the oxygen tension of the tissues is normal, the production equals the removal by tissue enzymes. These enzymes can be inactivated following breathing of 100% oxygen above 2 atm.abs for longer periods. Therefore oxygen free radicals accumulate to a degree that is lethal for cells in particular brain neurons. The acute oxygen toxicity limits the O2 diver to dives not deeper than 7 m and duration less than 75 min.

Retention of CO 2 under hyperbaric conditions, due to either increased fractional concentration of inspired CO 2 (F I CO 2) and/or decreased alveolar ventilation, or breathing a CO 2 -contaminated gas mixture, impairs neurological function. Problems associated with CO 2 retention are exacerbated in experienced divers, compared with non divers and amateur (recreational) divers. CO 2 retention at hyperbaric pressure can produce two types of neurological problems. First, retention of even modest levels of CO2 at hyperbaric pressure presumably increases nitric oxide radical (NO·) and results in cerebral vasodilation. Second, tissue P CO 2, induces CO2 toxicity without warning.

Diving at depths greater than 15 ATA can also result in HPNS, which is due to the effects of pressure per se and not to increased He partial pressure (P He), P O 2, or P CO 2. Signs and symptoms of HPNS include muscular tremors, EEG changes, loss of coordination, nausea, respiratory difficulties, memory deficit, and seizures which typically begin at 15-16 ATA or higher. H 2 is substituted for N 2 to produce a gas mixture of O 2 -H 2 -He, referred to as hydreliox which is also used for deep dives to delay onset of signs and symptoms of HPNS. H 2, compared with N 2, is even less dense and easier than He to breathe at pressure and it also affords protection from HPNS.

SL3

Man in Space

Dr. Savi Wimalasekera
University of Sri Jayewardenepura, Sri Lanka

Symposium on 'Stress and Depression'

SL4

Reversal of Stress-Induced Impairment of Hippocampal Long-Term Potentiation and Spatial Learning in Rats by Dopaminergic and Cholinergic Drugs

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Background: Severe, traumatic stress or repeated exposure to stress can result in long-term deleterious effects on the hippocampus, including dendritic atrophy and cell death, which, in turn, result in memory impairments and precipitate neuropsychiatric disorders like depression and anxiety. Further, chronic stress is known to affect hippocampal long-term potentiation (LTP), a cellular correlate of certain forms of memory. Earlier, we reported that the cholinergic muscarinic agonist, oxotremorine and a dopaminergic D2 receptor agonist, bromocriptine reverse chronic restraint stress-induced impairment in the performance of the radial arm maze task. However, the cellular mechanisms recruited by oxotremorine and bromocriptine to produce its effects are not known.

Objective: In the present study, we assessed the effects on LTP in the Schaffer collateral-CA1 synapses and spatial learning and memory in the Morris water maze.

Methods: Male Wistar rats were subjected to restraint stress for 21 days (6h/day) and oxotremorine (0.1 or 0.2 mg/kg, i.p.) or bromocriptine (5 or 10mg/kg, i.p.) treatment, once daily for 10 days followed by behavioral or electrophysiological evaluation.

Results: Stressed rats showed impairment in hippocampal CA1-LTP and the acquisition of the water maze task. Oxotremorine and bromocriptine treatment significantly reversed the stress-induced impairment of the hippocampal CA1-LTP and learning deficits.

Conclusion: These results together with our earlier findings demonstrate the cholinergic and dopaminergic systems as good targets for the development of drugs to treat stress and stress-related disorders.

SL5

Modulation of Adult Neurogenesis and Behavioral Depression by Stress, Enrichment and Pharmacological Agents

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Background: Adult neurogenesis in the hippocampus is influenced by various external factors including stress, enrichment and neurotransmitter levels. Chronic stress decreases neurogenesis while enriched environment favors the same. One of the functional attributes of hippocampal adult neurogenesis has been its role in learning and memory and mediation of the effects of antidepressants. Our earlier reports focusing on reversal of stress-induced deficits show that exposure to enrichment or administration of either bromocriptine (dopaminergic D_2 receptor agonist) or oxotremorine (cholinergic muscarinic agonist) ameliorated

stress-induced cognitive deficits. However, the plasticity of the stressed brain with respect to adult neurogenesis on exposure to these reversal paradigms remains unexplored.

Objective: In the present study, we examined adult neurogenesis and volumes of the dentate gyrus and hippocampus. We also evaluated the effect of stress and the reversal paradigms on stress-induced depression-like behavior in the force swim and sucrose consumption tests.

Methods: Male Wistar rats were subjected to restraint stress for 21 days (6h/day) and either enrichment (6h/day, 10 days) or pharmacological treatment [once daily for 10 days: oxotremorine (0.2 mg/kg, i.p.) or bromocriptine (5 or 10mg/kg, i.p.)] followed by immunohistochemical and behavioral evaluation.

Results: Chronic stress decreased adult hippocampal neurogenesis and total hippocampal volume, which was restored by the reversal strategies. Further, the reversal paradigms also ameliorated stress-induced depression-like behavior.

Conclusion: Our results suggest the possibility of harnessing the endogenous stem cell population for functional restoration under diseased conditions and provide an initial insight into molecular/cellular mechanisms underlying reversal of stress-induced dysfunctions.

SL6
Cellular and Molecular Basis of Depression-Induced Cognitive Deficits

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Background: Depression is a major mental illness, affecting significant population at some point in life and affects cognitive functions. Neuroimaging studies in major depressive patients show a volume reduction in the hippocampus and prefrontal cortex. The causes for memory impairment associated with depression, still not completely understood. Although several selective-serotonin reuptake inhibitors and selective norepinephrine reuptake inhibitors are beneficial in the treatment of depression, very little is known about the effects of these drugs on depression-induced learning and memory deficits.

Objective: We have evaluated the effect of chronic escitalopram and reboxetine treatment on depression-induced learning and memory impairments, hippocampal synaptic plasticity and neurotransmitter levels.

Methods: Depression was induced in male Wistar rats by the administration of clomipramine from postnatal days 8 to 21. The depressive rats were treated with escitalopram / reboxetine in adulthood. The cellular basis of action of these drugs on hippocampal synaptic plasticity, metabolism of biogenic amines and cognitive functions was evaluated.

Results: Neonatal administration of clomipramine resulted depression in adulthood. The depressed rats showed impairment in both acquisition and retention of a partially baited 8-arm radial arm maze task, decreased hippocampal cholinergic activity, serotonin, noradrenaline, dopamine levels, and impaired long-term potentiation (LTP) in the hippocampal Schaffer collateral - CA1 synapses. Chronic treatment with escitalopram / reboxetine ameliorated the depression induced learning and memory deficits, restored the AChE activity, levels of biogenic amines and hippocampal LTP.

Conclusion: Results of our study furthers knowledge on the effects of antidepressants on learning and memory and synaptic plasticity, and could ultimately assist in the development of better therapeutic strategies to treat depression and associated cognitive impairments.

Key words: Endogenous depression, cognitive deficits, biogenic amines, antidepressants, long-term potentiation, escitalopram, reboxetine.

Symposium on 'Glucose Homeostasis'

SL7
Translational Approaches to Exploring Islet Biology

Rohit N. Kulkarni MD PhD
Joslin Diabetes Center, Harvard Medical School, Boston MA, USA

Consistent with the theme of the meeting the speaker will discuss approaches to exploring islet biology with specific reference to recently identified human genetic polymorphisms and will highlight the significance of using physiological assays in the post-genomic era. Examples of genetic engineering approaches (knockout of candidate genes such as the insulin receptor gene in the pancreatic islet - or -cells) that provide insights into the pathophysiology underlying islet dysfunction in type 1 and/or type 2 diabetes will be compared and contrasted with translational approaches of creating models that express known human polymorphisms in an islet-cell-specific manner. These studies provide timely examples of how complementing basic science research with clinical studies allows planning appropriate therapy in a patient-specific manner to effectively prevent and/or cure diseases that affect glucose homeostasis.

SL8
Evolution of Noncommunicable Disease in Rural India and the Influence on Low Birth on Body Composition, Energy Expenditure and Insulin Sensitivity in a Rural Dravidian Community.

Nihal Thomas
Professor of Endocrinology, CMC Vellore

The prevalence of diabetes has shown an exponential increase in the country over the last three decades and rural India is now faced with a cataclysmic epidemic which could have far reaching consequences on the noncommunicable disease profile. Surveys and data-analysis by our group in rural Tamil Nadu and also other areas in the North of East of India show a rising trend towards prediabetes and diabetes to levels of almost 9% in rural Mongoloid communities.

Low birth weight is believed to be a predisposing factor for the prediabetic state that is present in almost 26% of rural India. The aim was to study the impact of being born with a low birth weight (LBW) on adult anthropometry and glucose metabolism, including insulin secretion and action, in a homogenous group of non-migrant young, rural Indian men. One hundred and seventeen young healthy men were recruited from a rural part in South India. Sixty-one subjects were born LBW and 56 were born with a normal birth weight (NBW). Subjects underwent a hyperinsulinemic euglycemic clamp, intravenous and oral glucose tolerance tests and a DEXA scan. Height, weight and glucose tolerance status were obtained from their parents too.

Assessments on energy expenditure with indirect calorimetry and the actiheart device were also performed. Men with LBW were shorter, lighter and had a reduced lean body mass compared to men with NBW. In addition, the LBW men had less leg fat mass/ total mass, a tendency towards reduced bone mineral content and increased diastolic blood pressure. More subjects had impaired glucose tolerance in the LBW than in the NBW group. However, *in vivo* insulin secretion and peripheral insulin action was similar in the two groups. Parents, and in particular mothers, of the LBW subjects were shorter than parents of the NBW subjects.

SL9
Clinical Phenotypes in Diabetes

Dr. Ganapathi Bantwal
Professor Department of Endocrinology, St. John's Medical College, Bangalore

Majority of cases seen in clinical practice belongs to the category of type 1 or type 2 diabetes mellitus.

There is a small percentage (5-10%) of cases which belongs to a different subset with specific etiologies.

Classically, type 1 DM clinically presents in lean, young individuals who have an abrupt onset of disease, are ketosis prone and are insulin dependent at diagnosis. It is caused by destruction of beta cells leading to a state of insulin deficiency usually secondary to an autoimmune process.

Type 2 DM is a heterogeneous disorder with a complex pattern of inheritance and is characterized by both impaired beta cells function and insulin resistance. Clinically, these patients will have markers of insulin resistance like obesity, acanthosis nigricans, fatty hepatomegaly, features of polycystic ovaries, high insulin/C-peptide levels; lack of ketosis, family history of Type 2 DM, asymptomatic onset of disease and ability to control sugars with oral hypoglycemic agents initially. Prevalence of childhood type 2 DM has been on the rise for past few decades. The above mentioned clinical phenotype may help in distinguishing them from type 1 at the time of diagnosis.

Latent autoimmune diabetes in Adults (LADA) is a type of slowly developing autoimmune diabetes which may be non-insulin dependent at diagnosis, but rapidly progress to insulin dependence over a period of 6 months to 3 years. Subjects with LADA and type 2 diabetes without the need for insulin treatment are phenotypically similar. Five clinical features were more frequent in LADA compared with type 2 diabetes at diagnosis:1) age of onset <50 years ($P < 0.0001$), 2) acute symptoms ($P < 0.0001$), 3) BMI <25 kg/m2 ($P = 0.0004$), 4) personal history of autoimmune disease ($P = 0.011$), and 5) family history of autoimmune disease ($P = 0.024$). Presence of auto antibodies will help distinguish these cases from type 2 DM.

Maturity-onset diabetes of the young (MODY) is a genetic subgroup of diabetes characterized by a clear dominant inheritance, early onset (<25 yr), high penetrance, and non-insulin dependence. At least one and ideally two family members should have diabetes diagnosed before 25yrs. They are usually non obese, lack features of insulin resistance and are negative for glutamic acid decarboxylase antibodies (GAD-Ab). Glucokinase (MODY 2) patients are often detected during screening in pregnancy. They show a pharmacogenetic effect with a specific sensitivity to sulphonylureas.

Fibrocalculous pancreatic diabetes (FCPD) is a unique form of diabetes secondary to chronic pancreatitis seen in developing countries of the world. FCPD affects young individuals and runs an aggressive course to reach the endpoints of diabetes, pancreatic calculi and exocrine pancreatic dysfunction. Tropical chronic pancreatitis (TCP) is a juvenile form of chronic calcific non-alcoholic pancreatitis, seen almost exclusively in the developing countries of the tropical world. The classical traid of TCP consists of abdominal pain, steatorrhoea, and diabetes. Diabetes is usually quite severe and of the insulin requiring type, although the requirement is very less but ketosis is rare.

Secondary diabetes is diabetes in which the underlying defect or disease process can be identified, in a relatively specific manner. Impaired glucose tolerance (IGT) and overt diabetes mellitus are frequently associated with acromegaly and Cushing syndrome. In patients with neuroendocrine tumours (NETs) the occurrence of altered glucose tolerance may be due to a decreased insulin secretion, like it happens in patients who underwent pancreatic surgery and in those with pheochromocytoma, or to an altered counterbalance between hormones, such as in patients with glucagonoma and somatostatinoma.

Mini Symposia

Sleep

SL10
"Sleep, Wake and Hippocampal Theta Gamma Activity: Relevance in Memory Consolidation"

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Sleep –wake behavior has been implicated in memory consolidation. However, there isn't much information with regard to the specific role played by these two behavioral states and the underlying intra hippocampal network events in consolidation of various aspects of memory events.

We have studied the hippocampal theta gamma activity during sleep wake behavior associated with spatial learning in rats. The study demonstrated a task dependent association of hippocampal theta gamma activity from different hippocampal structures. Acquisition of a working memory based task was associated with a significant enhancement in wake state and a reduction in the REM sleep where as the acquisition of a complex spatial task was associated with enhanced wake and REM sleep states. Our study suggests that post training sleep and wakefulness are an integral part of spatial information processing and maintenance of recent memories in the hippocampus. Similarly, a coordinated hippocampal theta gamma activity is necessary for the successful encoding and transfer of spatial information between hippocampus and the neocortex. Our study suggests the distinct role played by different hippocampal structures in the cognitive processing of spatial information during different temporal windows ; the CA3 area appears to be involved in rapid encoding and consolidation of working memory based events and coordinates with CA1 when the memory load increases. Ventral subiculum dynamically coordinates with either CA3 or CA1 to mediate the task dependent processing of spatial information.

SL11
Sleep Phenotypes and What is in It for the Physiologist

George D'Souza
Professor of Chest Medicine and Sleep Lab, St. John's Medical College and Hospital Bangalore

Sleep was defined as "the intermediate state between wakefulness & death" by Robert MaCnish in 1834. It is only in the last 60 years that sleep has been recognized as a complex amalgam of behavioural and physiological processes. The importance of sleep is only now being recognized. Epidemiological studies have shown that chronic sleep deprivation is associated with not only poor cognitive function but also an increased incidence of hypertension, diabetes and obesity. Obviously these are secondary to adaptive mechanisms that in the long term have a detrimental effect.

Two clinical phenotypes; OSAHS & narcolepsy are associated with excessive daytime sleepiness and are associated with significant metabolic effects. In the latter due to upper airway obstruction during sleep, there is sleep fragmentation causing EDS. In the latter it is due to REM sleep phenomena secondary to hypocretin deficiency.

The major risk factors for OSAHS are obesity, ventilation control abnormalities and facial dysmorphisms. Leptin produced by adipose tissue is important in weight control because of its effect on satiety. Leptin also has an effect on ventilation. Studies in obese rats suggest that OSAHS is probably a state of leptin resistance. Another system that has an effect on satiety is the serotinergic system and it also has an effect on the dilators of the upper airway. Understanding how these various systems interact may help define better treatment options.

The presence of ventilatory instability is another mechanism, which predisposes to OSA. Patients with OSA are more likely to have vetilatory instability. They have an exaggerated response to hypoxia. This predisposes to periodic breathing, which in turn in the presence of inspiratory loading may result in upper airway obstruction.

Narcoleptics have evidence of the metabolic syndrome with a higher BMI, higher waist to hip ratio, LDL and insulin resistance. This is seen despite a lower food intake and hypophagia. This is similar to what has been seen in patients with OSAHS. How divergent mechanisms of sleepiness have similar metabolic effects needs to be addressed.

A study of autistic children showed that there were 2 phenotypes based on –good sleepers and bad sleepers. The latter had more inattention, hyperactivity and restricted/repetitive behaviors.

To conclude sleep and its associated disorders have significant physiological effects, which are just being unraveled and hold the opportunity to physiologists to help answer the need for a good night's sleep.

Epigenetics

SL12
Epigenetics: Gene Regulation and Disease

Tapas Kundu
Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

SL13
Epigenetic Regulation in Cancers

TS Sridhar
Professor, Molecular Medicine,
St. John's Research Institute, Bangalore

Special SAAP Panel Discussion

Medical Education: Defining the role of Physiologists in South Asia

Convener: Prof. Mohammed Aslam – Pakistan

1. Bishnu Hari Paudel, Nepal
2. Sharaine Fernando, Sri Lanka "Teaching Physiology within an Integrated Curriculum"
3. Abida Ahmad, Bangladesh
4. GK Pal, India. Relevance of Physiology in Medical Curriculum
5. Muhammad Aslam, Pakistan "Contents, Context and Concepts in Physiology Teaching"

Relevance of Physiology in Medical Curriculum

G. K. Pal
Professor of Physiology,
Jawaharlal Institute of Post-graduate Medical Education and Research (JIPMER),
Pondicherry – 605 006, India.

Physiology is an integral part of medical curriculum. Physiology not only deals with the study of body functions, but also the regulation of functions and application of the knowledge of body functions in patient management and research. A student of medicine should understand that Physiology, which was referred to as a non-clinical subject few years before is now acknowledged as a pre-clinical subject; but in a near future physiology will be recognized as a pro-clinical subject. Physiology as a subject in medical science is not just limited to the education of first MBBS students as depicted in medical curriculum. Its relevance is more identified in learning Pharmacology, Pathology, General Medicine, Anesthesiology, Gynecology, Ophthalmology, Pulmonary Medicine, Cardiology, Neurology, Immunology, Nephrology, Endocrinology and so on. The importance of physiology lies in understanding the pathophysiology of a disease process and appreciating the physiological basis of management of diseases. It is the primary task of the teachers in physiology to make the student understand the importance of physiology in learning various aspects of medicine. A student should realize that it is impossible to become a physician without imbibing the basic concepts in physiology. Applied aspects of physiology can be taught more in second, third and final MBBS curriculum through various integrated clinical modules developed and designed collectively by all concerned collaborating departments and implemented officially by academic section of the institute. There should be provisions for clinical investigations such as pulmonary function tests, electrodiagnostic procedures (nerve conduction studies, EMG, evoked potentials etc), autonomic function tests, hormone assays etc. on hospital patients; and physiologists should be the integral part of patient management in the institute. Another important aspect of physiology lies in its contribution to medical research. Progress in medicine is directly or indirectly linked to research in Physiology. A good physiology department should have laboratories exclusively for carrying out research activities apart from the student laboratories that are meant for teaching and learning practical physiology. Students during their first MBBS curriculum should have some exposure to research laboratories that creates more interest in them for the subject. The emphasis should be given for clinical research involving clinicians in the research projects rather than conducting pure basic science research. If we are capable of impressing clinicians the role of physiologists in medicine, they will not only appreciate the relevance of physiology in medical science, but also will understand the value of involvement of physiologists in the patient care management and role of physiologists in clinical research. A medical student will learn the importance of physiology when he appreciates the involvement of physiologists in clinical medicine and research. Physiology course content should be designed to achieve this goal.

Free Communication (FC) and Poster Presentation (PP)

PP-A-01

A Study of Platelet Count and Bleeding Time in Chronic Renal Failure (CRF) Patients and the Effect of Dialysis

Ranjana Dhar, Wasima Jahan
Assam Medical College, Dibrugarh, Guwahati, Assam, India.

Background: The association between bleeding tendency and chronic renal failure is found to be very common. Various uremic toxins are responsible for this by causing a defect in the platelets. Hence, an attempt is made to find out if haemodialysis can reduce the risk of bleeding in CRF patients.

Objective: To estimate platelet count and bleeding time in CRF patients having bleeding tendency. To note the effect of short-term haemodialysis on platelet count and bleeding time in the same.

Design: In this study, 30 CRF patients having bleeding tendency are taken as cases. Cases are selected from the patients hospitalised in the Nephrology Dept. of Assam Medical College, Dibrugarh who are scheduled for dialysis. Patients having a history of any bleeding diathesis before diagnosis of renal failure are excluded. 30 healthy subjects with no history of bleeding diathesis are taken as control. Platelet count and bleeding time are estimated by using BRECHER & CRONKITE METHOD and DUKE'S METHOD respectively.

Results: Mean platelet count in cases before and after dialysis is found to be 171333+37638.33 & 177900+37287.65 respectively and in control it is 256000+57564.36. Mean bleeding time before and after dialysis in cases is found to be 332+30.75 & 236+16.56 respectively and in control it is 205+32.56. No marked alteration in platelet count is found before and after dialysis but significant improvement in bleeding time ($p < 0.05$) is found after dialysis.

Conclusions: Increased bleeding tendency in CRF patients may be due to platelet dysfunction caused by dialyzable uremic toxin.

Keywords: Platelet count; Bleeding time; CRF; Dialysis.

PP-A-02

Chronic Renal Failure and Cognitive Functions in Uremic Rats

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Background: In chronic renal failure (CRF), there is a gradual retention of substances called uremic toxins in the tissues and body fluids. These substances can bring about a number of biological and biochemical changes in the body. In addition to changes in biochemical parameters, chronic renal insufficiency leads to progressive behavioural conflict in rats and human subjects. Uremic toxins can affect both the central and the peripheral nervous system. Uremic encephalopathy is associated with problems in cognition and memory.

Objective: To study the psychomotor functional disorders in rats with progressive chronic renal failure.

Design: Surgical nephrectomy was done by resection method. The animals were grouped into two control groups, Sham control (SC) and Normal control (NC) and two uremic groups, Moderate uremia (GM) and Severe uremia (GS). Progress of uremia was monitored by estimation of urea and creatinine levels. Psychomotor analysis was done by passive avoidance in these animals at 4, 8, 12 and 16 weeks.

Results: After the incubation period, the nephrectomised groups (GM and GS) showed a significant increase in the time spent in the small compartment (exploration) compared to the controls (NC and SC) only in the 4-week group, but not in the

other (8, 12 and 16-week) groups. There was a significant increase in retention in the severe nephrectomised groups from 4th week onwards and from 8th week onwards in the moderate nephrectomised groups.

Conclusions: Psychomotor changes involve poor cognition and reduced memory from 8 weeks in the moderately nephrectomised groups and from 4 weeks onwards in the severely nephrectomised groups.

Keywords: Nephrectomy; Uremia.

FC-B-01

Decreased Valsalva Ratio in Nondiabetic Offspring of Type-2 Diabetic Parents

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Background: Type-2 Diabetes Mellitus has a strong genetic component. Individuals whose parents have Type-2 Diabetes Mellitus are at a 40% risk of developing Diabetes. Type-2 Diabetes Mellitus is now being diagnosed more frequently in children and young adults.

Objective: To study Cardiovascular Autonomic Functions in the offspring of Type-2 Diabetic parents.

Design: Study group: 30 normal healthy medical students (offspring of Type-2 Diabetic parents) in the age group of 18-21 years from BLDEU'S Shri B.M. Patil Medical College, Bijapur. Control group: 25 age-matched normal healthy medical students (offspring of Nondiabetic parents). Recording: Computerised 4 channel Physiopac (MEDICAID) used for recording the parameters.

Results: Statistical analysis done by unpaired Student's t-test and the results expressed as mean±SD. Mean Valsalva ratio±SD of study group was 1.28±0.24. Mean Valsalva ratio±SD of control group was 1.39±0.14 ($p < 0.05$). Gradings according to Ewing & Clarke; 16 out of 30 in the study group were graded either borderline/abnormal, whereas only 1 out of 25 in the control group was graded abnormal.

Conclusions: The above results reveal that there is an impairment in the Valsalva ratio (one of the Cardiovascular Autonomic Functions) in the offspring of Diabetic parents. This finding warrants further study of Cardiovascular Autonomic Functions in the offspring of Diabetic parents to prevent complications.

Keywords: Type-2 Diabetes; Mean Valsalva ratio.

PP-B-02

Normative Data of Spontaneous Baroreflex Sensitivity in A Healthy South Indian Population – A Pilot Study

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Background: Baroreflex mechanism is crucial for short term blood pressure (BP) regulation. Baroreflex function (BRS) can be assessed noninvasively by simultaneously measuring the changes in RR interval and BP. Normal BRS values are not available for the Indian population.

Objective: To study the baroreflex sensitivity in a sample of a South Indian population.

Design: After rest in supine position, continuous ECG and BP are recorded for 5 mins from the middle finger by photoplethysmographic technique (Finometer, Finapress medical systems, Netherlands) in 30 healthy volunteers (Age - 29±6.4 yrs; Sex - M:F - 22:8). Beat to beat RR interval and systolic blood pressure (SBP) are calculated from the artefact free ECG and Finometer recording respectively. In sequence method analysis, progressive change in the SBP by 1 mmHg with change in the successive RR intervals by >5ms in the same

direction are noted for 3 consecutive beats (Correlation - 0.85) and considered as an index of baroreceptor function. Autoregressive spectral analysis of SBP and RR intervals is obtained and the cross coherence between the low frequency power of SBP(LFSBP) and RR interval (α-LF) and the cross coherence between the high frequency power of SBP(HFSBP) and RR interval (α-HF) is calculated (CVPA software, Nevrokard, Slovenia).

Result: The average heart rate and systolic blood pressure was found to be 72±1.7 BPM and 117±1.9 mmHg respectively. BRS by sequence method was 18±1.7 ms/mmHg and the spectral BRS was found to be αLF-13±1.3, αHF-19±1.9.

Conclusions: BRS is altered in disease and has clinical prognostic significance. Normative BRS data is necessary to understand its significance in disease states. Our normative data differs from the data published in western studies. Hence, it is imperative to have normal data from Indian population, warranting further studies with a large sample.

Keywords: Baroreflex sensitivity; Blood pressure.

PP-B-03
Evaluation of Cardiovascular Autonomic Functions In Obesity

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Background: Since the ANS is involved in energy metabolism and regulation of the cardiovascular system, it can be considered that people with idiopathic obesity have an alteration in their autonomic nervous system that may promote obesity, ultimately leading to several clinical consequences such as sudden death, hypertension or other cardiovascular abnormalities.

Objective: To correlate three different values of BMI with the Cardiovascular Sympathetic & Parasympathetic functions.

Design: A total of 69 healthy subjects (not having any major illness and any chronic addiction) were selected for the study & were divided into three groups as follows: GROUP I - 22 males with BMI </=25, GROUP II - 23 males with BMI 25 – 30 & GROUP III - 24 males with BMI >/= 30. All the subjects were evaluated using "CANWIN" cardiac autonomic neuropathy analyzer; a windows based cardiac autonomic neuropathy analysis system with interpretation.

Results: An increase in Sympathetic activity and to some extent a decrease in Parasympathetic activity was found in correlation with obesity. The statistical analysis was done using SPSS version 16.0.

Conclusions: The study concludes that there is a more marked influence of obesity on Sympathetic nervous system activation. This could be because of Leptin resistance and diminished baroreceptor functions in obesity.

Keywords: Obesity; Autonomic dysfunction, Cardiovascular; Leptin resistance.

PP-B-04
Time Domain Indices of Heart Rate Variability in Obese Young Adults

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Background: Obesity is characterized by hemodynamic and metabolic alterations. In obese children and adults, it is shown that there is autonomic dysfunction.

Objective: To investigate the cardiovascular autonomic function in obese young adults using time domain indices of Heart Rate Variability (HRV) and to study the correlation between time domain indices and obesity indices.

Design: This study included 60 young adult subjects. According to the BMI, these subjects were divided into two groups - Obese (BMI = 25 kg/m^2) and Normal Weight (NW) (BMI = 18-22.9 kg/m^2). Obesity indices such as Waist Circumference (WC) and Hip Circumference (HC) were measured. Waist Hip Ratio (WHR) and Waist Stature Ratio (WSR) were also calculated. After informed consent, ECG was recorded in each subject in lead II for 5 mins using Power Lab system. HRV was analyzed using HRV module for Labchart 7.1 software. The study was approved by the ethical committee of our institution. Statistical analysis was done using Student's t-test and correlation analysis.

Results: There was a significant difference between the heart rate of the two groups ($p < 0.05$). Time domain indices SDNN, SDANN, rMSSD and pNN50 in the Obese group were significantly decreased when compared to the NW group ($p < 0.05$). NN50 was also decreased in the Obese group, however, the difference was not statistically significant ($p > 0.05$). Time domain indices had a negative correlation with obesity indices.

Conclusions: There was a significant increase in the heart rate and a decrease in the time domain indices of HRV in obese young adults indicating autonomic imbalance in these subjects. Autonomic imbalance can lead to cardiovascular diseases.

Keywords: Obesity; Obesity indices; Autonomic functions; Heart rate variability.

PP-B-05

Comparative Study of Heart Rate Variability, Heart Rate and Blood Pressure in Different Phases of Menstrual Cycle in Healthy Young Women Aged 18-22 Years

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Background: Heart rate variability (HRV) is a technique employed to explore the activity of the Autonomic nervous system (ANS).It is an important early marker for identifying different myocardial pathologies.

Objective: To compare and evaluate the changes in the ANS activity during different phases of the menstrual cycle.

Design: Fifty students aged 18-22 years with regular menstrual cycles were selected for the study. ECG recording was taken during different phases of the menstrual cycle by means of HRV power spectral analysis. Heart rate (HR) and Blood pressure (BP) were also recorded.

Results: The low frequency (LF) component was significantly higher ($p < 0.01$) during the luteal phase whereas the high frequency (HF) component was significantly higher ($p < 0.01$) in the follicular phase. The LF/HF ratio was significantly greater ($p < 0.01$) in the luteal phase compared to the follicular and the menstrual phases ($p < 0.001$). Changes in HR were maximum in the luteal phase and minimum in the follicular phase. BP did not show any significant change during different phases of the menstrual cycle.

Conclusions: These findings indicate that sympathetic nervous activity in the luteal phase is greater than in the follicular phase, whereas parasympathetic nervous activity is predominant in the follicular phase. A difference in the balance of ovarian hormones may be responsible for these changes of autonomic functions during the menstrual cycle.

Keywords: Heart rate variability; Autonomic nervous system; Menstrual cycle; Frequency domain analysis.

PP-B-06

Effect of Coronary Angioplasty on Heart Rate Variability Parameters

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Background: The autonomic nervous system controls cardiovascular function in health and disease. Altered autonomic response will have an adverse impact on cardiovascular function. Poor heart rate variability has a bad prognosis following myocardial infarction.

Objective: To compare the autonomic function between normal subjects and patients with coronary artery occlusion. To study the alteration in autonomic function following PTCA.

Design: Heart rate variability was evaluated in male patients with coronary artery occlusion (age group of 40-65 years) and anthropometrically matched control subjects using RMS Vagus. A 10 min ECG recording was used for measuring various parameters. In the time domain, SDNN and RMSSD and in the frequency domain, low frequency (LF), high frequency (HF) and LF/HF ratio were calculated. The recording was done once in control subjects after a rest of 15 mins while in patients, recordings were done once before PTCA and then on the 1st and the 3rd day following the procedure. The results were expressed as mean ± standard deviation and used for comparison. Results were analyzed using Mann Whitney and Wilcoxon Signed Rank Test.

Results: Control subjects had a higher SDNN and RMSSD when compared to patients with coronary artery occlusion. The difference was statistically significant ($p = 0.001$). There was however, no significant difference in the HRV parameters before PTCA and on the 1st and the 3rd day after PTCA.

Conclusions: Patients with coronary artery occlusion have reduced parasympathetic activity. There was no significant alteration in the autonomic functions up to 3 days after PTCA.

Keywords: Heart rate variability; Autonomic functions; Coronary angioplasty.

PP-B-07

Evaluation of HRV as A Marker of Cardiac Autonomic Neuropathy in Type II Diabetics

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Background: Cardiac autonomic neuropathy (CAN) is a common complication noted in diabetics. By the time symptoms of CAN develop in diabetics, autonomic nerve damage is probably irreversible and carries a poor prognosis. Therefore, an early recognition of CAN is important, as the autonomic complications of diabetes are potentially treatable.

Objective: The aim of the study was to determine whether short-term power spectral analysis of heart rate variability (HRV) has the potential to be a useful adjunct to clinical practice in early identification of CAN.

Design: In this cross-sectional study, 50 non-diabetic controls (Gp I) and 100 newly diagnosed type II diabetic patients with no clinical evidence of CAN were subjected to Ewings battery of autonomic function tests (AFT), HRV and routine ECG. Depending on their CAN score, diabetic patients were further divided into 2 groups - Gp II (CAN score = 0) and Gp III (CAN score >0).

Results: Prevalence of CAN in our study was 41%. Mean QTc intervals in Gp III, though less than critical value of 440 ms, differed from Gp I ($p < 0.05$). Handgrip test and High Frequency of HRV were abnormal in Gp III ($p < 0.05$).

Conclusions: HRV represents a promising noninvasive marker for identifying CAN at an early stage, as hand grip test is hindered by decreased strength in the elderly and QTc intervals prolong abnormally in the late stage. However, large prospective longitudinal studies are needed to determine the sensitivity, specificity and predictive value of HRV in the identification of individuals at risk for subsequent morbid and mortal events.

Keywords: Autonomic neuropathy; Diabetes; HRV.

PP-B-08

Assessment of Autonomic Nervous Activity in Autistic Children

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Background: Autism, in addition to neurodevelopmental symptoms also produces symptoms like constipation or diarrhea, urinary

retention and cold extremities suggesting underlying autonomic dysfunction.

Objective: To assess autonomic nervous activity of autistic children by measuring Heart Rate Variability (HRV) and Electro Dermal Activity (EDA).

Design: In this cross-sectional study, 15 autistics and 16 normal children were recruited. HRV was assessed by recording resting analog ECG signal and EDA was assessed by recording tonic skin conductance level using Power Lab, AD Instruments.

Results: Analysis of HRV data using Mann-Whitney U test showed that autistics had a significantly higher total ($p = 0.015$) and Low Frequency (LF) power spectrum ($p = 0.04$) compared to that of normal children indicating that autistics are associated with greater cardiac sympathetic activity. However, the absolute power of High Frequency (HF) of spectral power and relative powers of HF, LF and ratio of LF/HF did not differ between the groups. Analysis of EDA data showed that the minimum was significantly lower ($p = 0.02$) and the maximum was significantly higher ($p = 0.01$) in autistic children than that in the controls, though the mean EDA did not differ between the groups. The results of EDA indicate that autistics are associated with a wide range of fluctuation in sudomotor sympathetic activity.

Conclusions: The present study concludes that autistics are associated with altered cardiac and sudomotor sympathetic nervous activity and also suggests that autonomic nervous activity in autistic children may be better documented by assessing phasic activity for various sensory stimuli.

Keywords: Autism; Autonomic nervous activity; Heart rate variability.

PP-B-09
Study of Autonomic Dysfunction in Obesity

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Background: Obesity is associated with marked cardiorespiratory changes which lead to increase in Heart rate, Systolic blood pressure and Cardiac output significantly. Patients with increase in body mass index are exposed to recurrent episodes of tachycardia, hypoxemia and acute hemodynamic stress, leading to CVS morbidity.

Objective: The present study was aimed to evaluate CVS-autonomic dysfunction in obese individuals and also to assess the sensitivity of these tests.

Design: Groups: Subject were divided into two groups
Group 1 - Control
Group 2 - Obese (BMI = 30 – 35)

Subjects with BMI 40, subjects with neuromuscular disease, pregnant women, smokers and alcoholics were excluded from the study.

Heart rate variability was recorded during rest, standing, deep breathing, Valsalva's maneuver, cold pressor test and on isometric exercise using NIVIQURE Ambulatory ECG system (INCO, India).

Results: The data obtained was analysed using Student's t-test. There was an increase in the baseline activity of the sympathetic system in obese individuals when compared to normal individuals. The obese also have increased heart rate even at rest.

Conclusion: Positive sympathovagal imbalance even at rest could be due to defective baroreceptor response in the obese.

Keywords: Obesity; Autonomic dysfunction; Heart rate variability.

PP-B-10
Reproducibility of Short-term HRV Parameters During Different Physiological States

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Background: Reproducibility of Heart rate variability (HRV) parameters in resting supine position has been

studied earlier. We studied the reproducibility of these parameters when cardiac sympatho-vagal balance is altered by various physiological stimuli.

Objective: To study -

1. Consistency of changes in HRV during successively changing physiological conditions
2. Reproducibility of HRV parameters during different cardiac autonomic states

Design: Short-term HRV parameters were computed from 5 min ECG recorded successively in healthy volunteers (n = 25) during supine rest, standing, sitting and while doing arithmetic calculations, on two different days. Statistical analysis was done with ANOVA, Kruskal-wallis and Intraclass correlation coefficient tests.

Results: Mean RR during standing, sitting and while doing arithmetic calculations was significantly lower than that in the supine position on both days ($p < 0.05$). Total variability was similar across the conditions on both days. Significant changes in RMSSD, pNN50, LF nu and LF/HF ratio ($p < 0.008$) were observed in the standing position compared to the supine position on both days. Changes during sitting and arithmetic calculations were not consistent on the two days. Significant reproducibility of Mean RR, SDNN, pNN50, Total power, LF nu and LF/HF ratio were observed in the four conditions across the days ($p < 0.05$).

Conclusions: Consistent changes in HRV parameters compared to supine were seen only during standing. Parameters reflecting total variability and modulation of cardiac sympathetic and parasympathetic tones were reproducible in all states of altered sympatho-vagal balance. These findings are relevant when studying cardiac autonomic response to physiological perturbations using HRV parameters.

Keywords: HRV; Reproducibility; Sympatho-vagal balance; Cardiac autonomic tone.

PP-B-11

A Study of Heart Rate Variability To Determine the Stability of Blood Pressure During General Anaesthesia

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Background: The changes that occur during anesthesia could reflect more closely the effects on the autonomic nervous system. Heart rate variability (HRV) is a noninvasive tool which reflects autonomic control and may identify the risk of BP instability.

Objective: 1. To measure HRV in the perioperative period. 2. To determine the relationship between preoperatively measured HRV & blood pressure stability during the intraoperative & postoperative period.

Design: Study included 25 subjects posted for surgery under general anesthesia in the age group of 30-60 years. HRV was recorded for 5 minutes in supine position. Time domain (SDNN) analysis of HRV was done in the perioperative period. The results obtained were statistically analyzed using student t test & Annova test.

Results: In this study, 4 subjects were diabetic & 21 were normal. Preoperatively, in diabetics, the baseline SDNN was significantly less compared to normal patients. BP & HR were within normal limits in both the groups. Both groups showed a decrease in BP & SDNN during the intraoperative period, but it was significantly less in diabetics as compared to normal patients ($p < 0.001$). During the post operative period, BP & SDNN returned to baseline in both groups, but it remained significantly below baseline in diabetics as compared to normal patients with $p = 0.00$ indicating sympathetic dominance.

Conclusions: Our findings showed that patients with diabetes are susceptible to BP instability during general anesthesia (sympathetic dominance). As this test is done in few minutes, it can be used in identifying individuals who are at risk of hemodynamic instability preoperatively.

Keywords: Heart rate variability; General anaesthesia; Blood pressure.

PP-B-12
Evaluation of Cardiovascular Autonomic Function in Diabetic Patients Using Standard Autonomic Functions Test

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Background: Cardiac autonomic neuropathy (CAN) in diabetic patients is a serious and common complication. Unrecognized cardiac autonomic neuropathy can prove fatal in them. The present study was done to evaluate efficacy of standard cardiovascular reflex tests and QTc interval as a tool in diagnosis of CAN in diabetic patients.

Objective: To evaluate cardiovascular autonomic function in diabetic patients using standard autonomic functions test.

Design: Hundred randomly newly detected type 2 diabetic patients attending the Out Patient Department attached to JJM Medical College were selected for the study. Six cardiovascular reflex tests were carried out in them. These included resting HR, Valsalva ratio, deep breathing test, hand grip test, Heart Rate (HR) response to standing and QTc.

Results: Our study has shown that the values of different tests were within normal limits, but the values were slightly altered in diabetic patients with CAN score >0 ($p < 0.01$). Out of 100 diabetic patients, 41 individuals had borderline CAN and 25 patients had QTc values >440. Among cardiovascular tests, hand grip test and QTc interval showed significant changes.

Conclusions: The findings of our study suggested that no single test is useful in the diagnosis of CAN, but a combination of various tests can help in early diagnosis of CAN. In this study, blood pressure response to hand grip test and QTC interval measurement have shown some promise as useful tests for screening diabetics patients for CAN. However, a larger study is required to arrive at a definite conclusion.

Keywords: Cardiac Autonomic Neuropathy (CAN); Diabetes Mellitus (DM).

PP-B-13
Cardiorespiratory Fitness and HRV in Amateur Athletes: Randomised Control Study

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Background: Autonomic nervous system plays an important role in the regulation of the cardiovascular system both in ensuring optimal function during activities in healthy individuals and also in mediating several manifestations of cardiac disease.

Objective: To measure the effect of moderate endurance training on autonomic balance through analysis study of Heart rate variability (HRV), VO2 max and arterial blood pressure (ABP).

Design: The study was conducted on 30 healthy randomly selected male volunteers (18-21 years) from Yenepoya University. Initial clinical history was taken and examination done to rule out any systemic disease. Informed consent was taken and ethical clearance was also obtained. The group was divided into an experimental group consisting of 19 athletes who underwent 12 weeks of moderate endurance training

and a control group consisting of 11 non athletes. At the end of 12 weeks, HRV, ABP and VO2 max were recorded. Queens's college step test was used to predict maximal aerobic capacity (VO2 max). HRV was calculated manually by measuring R-R interval from the ECG recorded in lead II for 60 seconds.

Results: Unpaired t test was used to analyse the data. The analysis showed that the HRV is significantly higher in the control group than the experimental group ($p < 0.0005$). ABP showed no significant difference between both the groups. VO2 max is significantly higher in the experimental group than the control group ($p < 0.0005$).

Conclusions: Endurance training results in better cardiorespiratory fitness and enhanced vagal activities in athletes, which may contribute in part to the resting bradycardia.

Keywords: Cardiorespiratory fitness; VO2 max; HRV; Athletes.

PP-B-14

Autonomic Status in Iron Deficient Anemic Adolescents

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Background: Autonomic function is impaired in anaemic patients with various aetiologies such as vitamin B_{12} deficiency, sickle cell anaemia and thalassemia major. However, there is insufficient data about autonomic functions in patients of iron deficiency anaemia, the predominant cause of anaemia in the general population.

Objective: Assessment of autonomic status in iron deficient adolescent girls.

Design: Healthy adolescent girls between the age of 17-18 years having Hb >12 gm/dl formed the control group, i.e. Group I (n = 30). All students having Hb <12 gm/dl and S.Ferritin <12 µg/dl formed Group II, i.e., the iron deficient anaemic (IDA) group.

Results: The data collected was analyzed using Students t-test. The mean Hb level in Group I was 12.93 ± 0.86 and Group II was 10.08 ± 0.51 ($p < 0.001$). MCV, MCH, MCHC, S.Ferritin, & S.Iron were lower in Group II, while TIBC was higher.

Resting heart rate was significantly higher in Group II. Resting systolic blood pressure was significantly lower ($p < 0.001$) in Group II (102.33 ± 6.76) than the control group (110.33 ± 8.87). Diastolic blood pressure did not show any significant difference. There was a significant increase in systolic as well as diastolic blood pressure in response to the cold pressor test, though the rise in BP in the anaemic group was significantly less ($p < 0.001$) than the control group. Valsalva ratio in the anaemic group (1.51 ± 0.07) demonstrated a significant decline ($p < 0.001$) as compared to the control group (1.70 ± 0.07).

Conclusions: The present study reveals the affliction of both divisions of ANS in anaemia.

Keywords: Autonomic function; Iron deficiency anaemia.

PP-B-15

Heart Rate Variability and Wellbeing Index After Sleep Deprivation

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Background: Cardiovascular function is dependent on factors such as sleep and stress. Lack of sleep can act as a stressor, thereby bringing about an autonomic disturbance which in turn may contribute to the development of cardiovascular diseases.

Objective: To study whether shift work causes poor wellbeing and induces discordance in the cardiac autonomic control.

Design: Thirty six BPO employees aged 25.69±3.56 years with BMI 21.94±3.8 kg/m2 were recruited for the study. ECG recording was done in lead II for 5 minutes. Time domain parameters of heart rate variability, SDNN (the standard deviation of all R-R intervals) and RMSSD (root mean square of sum of squares of differences between adjacent NN intervals) were measured using RMS Vagus HRV software. WHO well being index (WBI) questionnaire and Epworth sleepiness scoring (ESS) was administered to workers before starting and at the end of one week of continuous night shift.

Results: The results were expressed as mean±SD with $p < 0.05$ as significant. SDNN (index of parasympathetic control of the heart) decreased from 49.62±21.12 to 43.22±13.97 ms after one week ($p = 0.028$). WBI decreased and ESS increased significantly after one week of night shift work.

Conclusions: Continuous night shift causes sleep deprivation and affects wellbeing of the worker which could facilitate an altered state of mind leading to depression in them. A decreased vagal activity and a sympathetic predominance may have a contributory role in the development of cardiovascular diseases in shift workers.

Keywords: Autonomic function; Shift work; Sleep deprivation; Heart rate variability.

PP-B-16
Heart Rate Variability in Patients With Essential Hypertension

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Background: Essential hypertension may be associated with altered cardiovascular autonomic nerve function. Heart Rate Variability (HRV) analysis is an important tool for quantitative measurement of autonomic nerve activity.

Objective: To assess the cardiac autonomic nerve function status in essential hypertension by analyzing time domain measures of heart rate variability.

Design: This cross-sectional study was carried out from 1st July 2008 to 30th June 2009. For this purpose, 60 hypertensive male patients (40-60 years (group B)) were enrolled from the Out Patient Department of Cardiology, BSMMU, Dhaka. Based on the treatment received, the hypertensive patients were subdivided into group B1, i.e untreated patients on their 1st day of diagnosis and group B2 patients on antihypertensive therapy. For comparison, 30 age- & sex-matched apparently healthy normotensive subjects (group A) were also studied as the control group. Time domain measures of Heart Rate Variability (HRV) such as Mean RR intervals, Mean HR, SDNN & RMSSD were assessed by a Polygraph machine to observe both sympathetic and parasympathetic nerve function status.

Results: Mean R-R interval, SDNN and RMSSD were significantly ($p < 0.01$) lower but mean heart rate was significantly ($p < 0.01$) higher in untreated hypertensive patients than those of normotensive subjects. But differences in all these 4 parameters, when compared between control and treated hypertensive patients were found to be statistically nonsignificant.

Conclusions: Impaired cardiac autonomic nerve function characterized by sympathetic overactivity may occur in hypertensive patients.

Keywords: Mean RR; SDNN; RMSSD; Hypertension.

PP-B-17
Comparison of Cardiac Autonomic Nervous Activity Between Obese and Nonobese Young Adults Using Heart Rate Variability Test and Hand Grip Dynamometer Test

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Background: Obese people have a high prevalence of cardiovascular disease, but the mechanism of this result remains obscure.

Objective: To compare cardiac autonomic nervous activity between obese and non-obese young adults using heart rate variability (HRV) test and hand grip dynamometer test.

Design: Sixty obese (30 males, 30 females) and 60 non obese (30 males, 30 females) healthy young adults aged 18-25 years were selected based on body mass index (BMI). HRV power spectral analysis was done and total power (TP), low-frequency (LF) power and high frequency (HF) power were identified. Hand grip dynamometer test was performed to elicit sympathetic cardiovascular functions during isometric exercise.

Results: HRV analysis found significantly lower values of TP, HF and HF(n.u) and significantly higher values of LF(n.u) and LF/HF ($p < 0.001$) among the obese group compared with the non-obese group. The blood pressure response to an isometric exercise test using the hand grip dynamometer revealed that the increase in the diastolic blood pressure was significantly lower ($p < 0.001$) in the obese group in comparison to the non-obese group.

Conclusions: Our data indicate that obese subjects have decreased parasympathetic activity as evidenced by a decrease in HF and HF(n.u) and an increase in sympathetic activity as evidenced by the increase in LF(n.u). Blood pressure response to an isometric exercise is impaired in obese subjects due to lower sympathetic activation. These results indicate that obesity can affect cardiac autonomic nervous activity explaining one of the probable mechanisms by which obesity increases cardiac mortality.

Keywords: Heart rate variability; Hand grip dynamometer; Obese; Autonomic nervous activity.

PP-B-18

Evaluation of Cardiovascular Sympathetic Activity During the 1st And 2nd Trimesters of Pregnancy

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Background: Normal pregnancy is associated with substantial changes in the cardiovascular system. It has been noted that stroke volume, cardiac output and blood volume begin to change as the pregnancy advances and systemic vascular resistance is also decreased in response to these hemodynamic changes. The present study was hence planned to investigate the sequential changes in cardiovascular sympathetic activity during the 1st and 2nd trimesters of pregnancy.

Objective: 1. To study and compare the effect of pregnancy on cardiovascular sympathetic functions. 2. To establish the relation between pregnancy and cardiovascular sympathetic functions.

Design: Pregnant women between the age of 18 to 28 years visiting Pravara Rural Hospital for ANC were considered for the study and grouped as - GROUP I - 1st TRIMESTER (33 cases) and GROUP II - 2nd TRIMESTER (33 cases). The duration of the study - September 2008 to August 2009. Pregnant women with H/O chronic major illness and addiction were excluded. Cardiovascular Sympathetic Tests - 1. Blood pressure response to standing and 2. Blood pressure response to sustained handgrip were assessed by CANWIN CARDIAC AUTONOMIC NEUROPATHY ANALYSER.

Results: Comparison of the sympathetic tests between Group I and Group II showed no statistically significant result in the BP response to standing ($p > 0.05$) but a

statistically significant result was noted in the BP response to sustained hand grip ($p < 0.05$).

Conclusions: 1. Sympathetic dysfunction was present during both the trimesters but to a greater extent in the 2nd trimester of pregnancy. 2. These results explain decreased sympathetic activity and impaired baroreceptor sensitivity as pregnancy advances.

Keywords: Hemodynamic changes; Pregnancy; Sympathetic activity; Systemic vascular resistance.

PP-B-19

Assessment of Sympatho-vagal Imbalance by a Simple Test of one Minute Heart Rate Variability in Patients

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Background: The naturally occurring fluctuation or beat-to-beat change in heart rate is termed heart rate variability. Heart rate variability (HRV) is a sensitive marker of cardiac sympathetic activity.

Objective: To determine and compare the HRV in patients with Type 2 DM with those of Non-diabetic controls.

Design: Sixty Diabetic patients attending the outpatient department of Karnataka Institute of Diabetology, Bangalore and 60 age-matched controls were enrolled for the study. HRV was performed on all the subjects and the results obtained were compared between the groups. The One minute HRV was analyzed during deep breathing and defined as the difference in beats/ minute between the shortest and the longest heart rate interval measured by lead II electrocardiographic recording during six cycles of deep breathing using Cardiart6108-T.

Results: A statistically significant decrease in mean minimal heart rate and One minute HRV (16.30+6.42 vs 29.33+8.39) was observed during deep breathing among Type 2 Diabetic patients on comparison with that of healthy controls. There was no significant difference in the mean maximal heart rate between the groups.

Conclusions: HRV analysis has become an important tool in cardiology because its measurements are non-invasive and easy to perform, have relatively good reproducibility & provide prognostic information on patients with heart diseases. HRV has proved to be a valuable tool to investigate the sympathetic and parasympathetic function of the ANS, especially in diabetic and post infarction patients.

Keywords: Heart rate variability; Sympathetic function; Parasympathetic function.

PP-B-20

Decrease in Cardiovascular Parasympathetic Function Tests with Age in Adults (18-65 Years)

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Background: Age-related autonomic neuropathy may produce clinical symptoms directly or result in subclinical disease, complicate therapeutic intervention in variety of diseases or decrease safety margin, upon which superimposition of additional insults (e.g. diabetes) produces symptomatic disease.

Objective: To evaluate the effect of age on cardiovascular parasympathetic function tests in healthy subjects of both sexes (18-65 years).

Design: This cross-sectional study was carried out in 152 healthy subjects in the age range 18-65 years. Subjects were divided into four groups according to

their age - Group I 18-19 years, Group II 20-34 years, Group III 35-54 years and Group IV 55-65 years (according to medical-dictionary.thefreedictionary.com/middle-aged). Parasympathetic activity was assessed by the Heart rate response to 1) deep breathing 2) Valsalva maneuver and 3) standing using the Student Physiograph. Statistical analysis was done using SPSS (p value <0.05 significant).

Results: Mean value of Valsalva ratio showed significant (p = 0.04) gradual decrease from Group I to Group IV. Heart rate response during deep breathing (I-E) and standing (30:15 ratio) showed gradual highly significant (p = 0.000) decrease from Group II to Group IV.

Conclusions: Parasympathetic function tests showed significant gradual decrease in function as age advanced from 18-65 years. Net effect of these changes is reduced efficiency in the autonomic nervous system which reduces the ability to put into effect the responses required to maintain physiological homeostasis.

Keywords: Parasympathetic function tests; Valsalva maneuver; I-E; 30:15 ratio.

PP-B-21
Cardiovascular Response to Short Term Head Up Tilt

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Background: Head up tilt (HUT) has long been considered as a convenient model to study reflex responses to gravitational stress. This test is useful in assessment of cardiovascular reflex response of subjects involved in occupations like flying. HUT has become an accepted diagnostic tool in the study of "Neurocardiogenic syncope".

Objective: To study the cardiovascular autonomic function parameters like Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP) and Pulse Pressure (PP) at supine, 300, 600 and 800 HUT.

Design: The study was conducted on 30 healthy male subjects aged 18-25 years. A manually operated tilt table was used to do the test. The parameters which represent the cardiovascular autonomic function were recorded in each degree of tilt. Results were presented as Mean & SD. The One-way ANOVA test was used for the multiple group comparison.

Results: There was a progressive increase in mean HR and mean DBP (mmHg). The mean resting SBP (mmHg) decreased, MAP gradually increased and PP gradually decreased on progressive HUT.

Conclusions: When humans assume the upright posture, a hydrostatic venous pooling of the blood in the lower extremities takes place, leading to reduction in stroke volume which may cause reduction in cardiac output and SBP. This low pressure in the carotid sinus removes stretch from the baroreceptors leading to increase in sympathetic flow from the brainstem center which in turn increases the HR and DBP and hence changes in MAP and PP were observed.

Keywords: Head up tilt; Heart rate; Systolic blood pressure; Diastolic blood pressure.

PP-B-22
Acute Effect of Alternate Nostril Breathing on Autonomic Functions

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Background: Regular practice of breathing exercise has shown to improve autonomic functions by decreasing sympathetic activity or by increasing vagal tone. Different breathing techniques like alternate nostril breathing (ANB) have various modulatory effects on autonomic functions.

Objective: The present study was carried out to validate the hypothesis that short term practice of ANB causes modulation of autonomic parameters.

Design: The study was conducted on 20 young healthy volunteers of the age group 18 to 30 years. The autonomic parameters were assessed by evaluation of heart rate (HR, beats/minute), galvanic skin resistance (GSR), finger tip temperature (FTT,0F) and heart rate variability (HRV), which was carried out both pre and post short term practice of ANB. The mentioned parameters were recorded on a digital polygraph (Medicaid).The study was conducted in a thermoneutral environment. The procedure was demonstrated and the subjects were trained to do ANB. Following basal recording they were instructed to perform ANB for 20 minutes and parameters were reassessed.

Results: The observed data was analyzed by comparing the basal parameters with the parameters following 20 min of ANB using non parametric, Wilcoxon Signed Ranks Test. Decrease in the mean values of GSR ($p=0.0037$) and HR ($p=0.005$) was observed, however there was an increase in FTT ($p=0.005$). HRV analysis indicated an increase in the LF/HF ratio with a significant decrease in VLF ($p=0.005$).

Conclusions: These results suggest that short term practice of Alternate Nostril Breathing can modulate the autonomic activity towards parasympathetic dominance.

Keyword: ANB; Breathing

PP-B-23

Comparison of Resting HRV in Habitual Caffeine Consumers With and Without Pre-test Abstinence of Caffeinated Beverages

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Background: Acute effects of caffeine consumption on heart rate variability (HRV) have been studied and more than 6 hour abstinence from caffeinated beverages is advocated prior to autonomic function testing. Do habitual caffeine consumers need to abstain from their regular morning intake of caffeinated beverages before recording ECG for HRV. The present study addressed this question.

Objective: To study the HRV in habitual caffeine consumers with and without their routine morning intake of caffeinated beverages, controlling all other confounding influences.

Design: Short-term HRV was analysed in 25 healthy habitual caffeine consumers (26±4 yrs) from 5 min resting supine ECG on 2 different days. On one day they abstained from caffeine consumption from 9 PM the previous night. On the other day the recording was done 2-4 hours after their regular morning consumption of caffeinated beverages. The order of recordings with and without caffeinated beverages was randomised as per a computer-generated list of random numbers. On both the days, ECG was recorded 2-4 hours after a light breakfast and before 11 AM. The individuals were also advised to avoid heavy physical activity for 24 hours prior to the recording. Statistical analysis was done with Wilcoxon signed rank test.

Results: None of the time domain and frequency domain parameters of HRV were significantly different ($p > 0.05$).

Conclusions: Short-term HRV parameters, 2-4 hours after routine caffeine intake, in habitual caffeine consumers, were not different from when they abstained from the usual intake.

Keywords: HRV; Habitual caffeine consumers; Pre-test abstinence.

PP-B-24

Comparative Study of Short-term HRV Measures at Two Different Time Periods of the Day in Healthy Subjects

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Background: Circadian changes in heart rate variability (HRV) over 24 hours have been reported. We investigated whether short-term HRV parameters obtained from 5-min ECG recordings in the morning and afternoon would

reveal any variations. This would help in establishing the protocol for clinical follow-up with HRV.

Objective: To compare the short-term HRV parameters from 5-min ECG recordings obtained in the morning and afternoon.

Study design: Short-term HRV analysis was done on 5-min ECG obtained from 25 healthy volunteers (25±4 yr) in the morning (8-11 AM) and afternoon (2-4 PM) on 2 different days, after randomisation. All recordings were made 2-4 hours after a light breakfast or lunch, maintaining routine pre-test precautions.

Results: There was a significant decrease in mean RR interval (895.9±116.6, 828±123.3, P=0.001), SDNN (66±25, 56.5±20.5, P=0.037) and pNN50 (37±22.2, 27±21, P=0.007) in the afternoon. None of the other HRV measures were significantly different. Significant increase in the respiratory rate was also observed (18±3, 19±3, P=0.036).

Conclusion: Though a decrease in time-domain indices were seen in the afternoon compared to the morning, these indices are better interpreted in long-term HRV analysis. Spectral indices, which are better physiologically correlated to total variability and sympathovagal balance in 5-min HRV, did not show any change. Hence, in the clinical setting, spectral indices of short-term HRV data obtained in the morning and afternoon may be compared.

Keywords: Heart rate variability, spectral indices

PP-B-25

The Effect of Vitamin B_{12} Status on Heart Rate Variability in a Healthy Elderly Population in South India

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Back Ground: Vitamin B_{12} deficiency is a worldwide problem. There are no population based data on vitamin B_{12} status in elderly Indians. But the extent of the problem is likely to be high at least, if not higher, than the prevalence reported in western countries for a variety of reasons.

Objective: To assess cardiac sympathetic and parasympathetic activity using heart rate variability (HRV) in elderly individuals of low and high vitamin B_{12} status and to study the effect of vitamin B_{12} supplementation in those with low vitamin B_{12} status.

Methods: 140 elderly subjects aged > 60 years were screened and 48 subjects fitted the criteria. They underwent blood sampling, HRV, nerve conduction and cognition assessment. Subjects were classified based on their age (≤65 years and >65 years) and based on median plasma vitamin B_{12} level (118 pmol/L) into lower vitamin B_{12} and higher vitamin B_{12} groups.

Results: Low frequency (LF) HRV presented in absolute units was significantly higher in the high vitamin B_{12} group when represented as a complete group. When stratified by age, among ≤ 65 years age group, high vitamin B_{12} group demonstrated a significantly greater response. About 9% of the variability in LF was explained by vitamin B_{12} status. Post supplementation LF and HF (high frequency) HRV in absolute units and total power were significantly raised as compared to pre-supplementation values when analyzed as a complete group and in ≤65 years age group.

Conclusions: Evaluation of vitamin B_{12} deficiency and its supplementation is best done in "younger" elderly individuals in order to achieve enhanced effects on the autonomic nervous system.

Key words: Vitamin B_{12}; Heart rate variability

FC-C-01

Effect of Air Pollution on Platelet Aggregability and Prothrombin Time

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Background: Air pollution is a major environmental problem affecting everyone in developed as well as developing countries like India. In an urban Indian city like Pune, with the increase in population, there has been an increase in vehicular traffic, leading to increased air pollution mainly due to diesel exhaust. An increase in air pollution causes changes in hemostatic function, leading to increased incidence of coronary thrombosis, which is the precipitating factor for myocardial infarction. Platelet aggregability is an important index of cardiovascular health. Therefore, platelet aggregability and prothrombin time were selected as parameters for the present study.

Objective: To study whether increase in platelet aggregability or alteration in prothombin time is due to air pollution.

Design: Thirty auto-rickshaw drivers chronically (more than 5 years) exposed to air pollution in Pune were selected as the study group according to the inclusion and exclusion criteria. Also, 30 subjects who were minimally exposed to air pollution were selected as the control group after matching age and sex. In both the groups, platelet aggregability was measured by the ADP induced adsorbance technique (with the help of a photoelectric colorimeter) and prothombin time was measured with an automated blood coagulation analyzer. Results were analysed statistically using the t test.

Results: It was observed that platelet aggregability was significantly increased in the study group as compared to the control group. However, no statistical significance was noted in the case of prothrombin time.

Conclusions: This study concludes that exposure to air pollution probably alters hemostatic function as platelet aggregability showed significant alterations in subjects exposed to air pollution.

Keywords: Air pollution; Platelet aggregability; Prothrombin time.

FC-C-02

Glucose-6-phosphate Dehydrogenase (G6pd) Enzyme Status: In Health and Disease

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Background: G6PD deficiency is a clinical enzymopathy. Supplementation of vitamin E can improve anemia in G6PD deficients.

Objective: To observe the G6PD status in healthy subjects and in some diseases.

Design: Cross-sectional studies to observe the erythrocyte G6PD status in healthy subjects and in hemolytic anemia, neonatal jaundice, type 2 Diabetes Mellitus and complicated pregnancy (bad obstetric history, preeclampsia). In addition, effects of vitamin E supplementation on G6PD deficients with hemolytic anemia were also observed.

Results: In hemolytic anemia, the G6PD level was significantly ($p < 0.001$) lower in deficients than in healthy and non-deficient patients. Again, it was significantly ($p < 0.001$) lower in all the hyperbilirubinemic neonates, pregnant women with previous bad obstetric history, preeclamptic women with past BOH or preeclampsia and controlled and uncontrolled diabetic females. Vitamin E supplementation of G6PD deficients with hemolytic anemia, results in a significant ($p < 0.001$) lower levels in both the study groups compared to their pre supplemented state to healthy controls. After 60 consecutive days of supplementation, these values were

slightly increased in the supplemented group compared to their pre-supplemented state and the non-supplemented patients

Conclusions: These studies conclude that G6PD deficiency may be a risk factor for hemolytic anaemia and hyperbilirubinemia in neonates and pregnant women with bad obstetric history. In addition, antioxidant vitamin E supplementation may improve the deficiency status.

Keywords: G6PD; Hemolytic anemia; Hyper-bilirubinemia; Diabetes mellitus.

FC-C-03

Effects of Vitamin E Supplementation on Some Aspects of Hematological Variables in Patients of Hemolytic Anemia with Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency

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Background: Vitamin E works within the cell membrane as an antioxidant and may prevent destruction of RBCs in G6PD deficient hemolytic anemia.

Objective: To evaluate the role of vitamin E supplementation in reducing chronic hemolysis in patients with G6PD deficiency.

Design: One hundred and two subjects, age 5-40 years of both sexes were selected for the study; of these 68 were G6PD enzyme deficient patients, 34 were supplemented with vitamin E (800 IU/day, adults; 400 IU/day, children) and 34 were not supplemented. Age- and sex-matched 34 healthy subjects with normal G6PD level were taken as controls. G6PD level, Hb%, TC of RBC, PCV, reticulocyte count and serum bilirubin level were measured on day 1 for all groups and also on day 60 in the deficient group.

Results: Blood Hb%, TC of RBC and PCV were significantly lower but reticulocyte count and serum bilirubin were significantly higher in patients with G6PD deficient hemolytic anemia in comparison to the healthy control group. After supplementation with vitamin E (i.e. on day 60), Hb concentration, total count of RBC and PCV significantly increased, whereas reticulocyte count and serum bilirubin levels significantly decreased towards those of healthy control in supplemented group in comparison to pre-supplemented (day-1) and non-supplemented groups.

Conclusions: Deterioration of some hematological parameters occurs in G6PD deficiency. These however improve following vitamin E supplementation, indicating a role for this antioxidant vitamin in reducing the rate of hemolysis.

Keywords: G6PD deficient hemolytic anemia; Vitamin E.

PP-C-04

A Study of Hematological Parameters of Newborn from Umbilical Cord Blood

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Background: It is well known that newborn hematological parameters differ from those of infants or adults.

Objective: 1. To establish reference hematological values for medical research and clinical practice. 2. To compare these results with those reported by other authors.

Design: In this cross-sectional study, umbilical cord blood samples were collected from 30 newborn (male

= 14; female = 16), birth weight 1.3 to 3.8 kg, from the Department of Obstetrics and Gynecology, Assam Medical College, Dibrugarh. Hemoglobin was estimated by the cyanmethemoglobin method, RBC, WBC and platelets were counted using Neubaeurs counting chamber, DLC was assessed by light-microscopy in Leishman's stained smears, PCV by Wintrobes method and MCV, MCH and MCHC were obtained by derivation.

Results: After conclusion of the study, the values for hemoglobin, RBC, WBC, Platelet count, PCV, MCV, MCH and MCHC were found to be 16.85±2.46 gm/dl, 5.22±0.70 million/mm^3, 7010.00±2457.47/mm^3, 3.32×105±1.6×105/mm^3, 53.68±5.81%, 103.53±9.53 famtoliter, 32.70±5.50 pgm, 31.58±4.38% respectively. The differential leukocyte count for Neutrophil, Lymphocyte, Monocyte, Eosinophil and Basophil were found to be 55.00±10.75%, 38.96±11.13%, 2.88±1.36%, 3.16±1.99 and 0±0% respectively.

Conclusions: The results were comparable to those found in other studies reported by different authors except for the total WBC Count and Monocyte count which were found to be lower.

Keywords: Hematological Parameters; Newborn; Cord blood

PP-C-05
Study of The Relation of Cord Blood Hemoglobin and Maternal Hemoglobin

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Background: Hemoglobin serves as an iron reserve in the fetus and is needed for infants to adapt with anemia. Many factors can decrease hemoglobin level at birth leading to physiological anemia.

Objective: The aim of the study is to measure the cord blood hemoglobin and to determine its relation with maternal hemoglobin.

Design: In this cross-sectional study, hemoglobin concentrations were measured in the cord blood and maternal blood taken a few hours before birth. Cord blood samples were taken from 30 healthy neonates, male (14) and female (16), gestational age 37 to 42 weeks and birth weight 1.3 to 3.8 kgs. Hemoglobin was estimated by the cyanmethemoglobin method. Data were analyzed statistically using T-test.

Results: The cord blood hemoglobin was found to be 16.35±2.11 (12.65 – 22.910 gm/dl) while the maternal haemoglobin was found to be 9.46±1.50 (8 - 14.7 gm/dl). Values for male and female neonates are 16.74±2.20 (14.458 – 22.91 gm/dl) and 16.00±2.03 (12.65 – 19.277 gm/dl) respectively.

Conclusions: No association could be found between cord blood and maternal hemoglobin. After statistical analysis, the difference of cord blood hemoglobin between male and female neonates was found to be insignificant ($p > 0.05$). It was also noted that the mean hemoglobin in neonates was less than the previously reported value.

Keywords: Hemoglobin; Neonate Cord blood.

PP-C-06
Study of Distribution of ABO and Rh Groups in Diabetes Mellitus

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Background: Certain diseases show strong evidence of association with ABO blood groups; for example, duodenal ulcer with blood group O and cancer with blood group A. However, there are conflicting results with regard to Diabetes Mellitus. Diabetes Mellitus is very common in this part of the region and so far no studies have been carried out to find out the association of Diabetes Mellitus with blood groups.

Objective: The present study was carried out to find out whether there is any relation between blood groups and the occurrence of Diabetes Mellitus.

Design: To conduct this cross-sectional study, 30 patients with fully established Diabetes Mellitus were selected. For ABO typing, standard serological procedures were followed using Anti-A, Anti-B and Anti-D sera. The results were statistically analyzed.

Results: Among the 30 diabetic patients, the various blood groups were found to be O+ve (n = 11) 36.67%, A+ve (n = 8) 26.67%, B+ve (n = 7) 23.33%, B-ve (n = 1) 3.33% and AB+ve (n = 3) 10%.

Conclusions: Diabetes Mellitus was found to occur in all the ABO blood groups. However, O+ve and A+ve are more susceptible. According to a previous study carried out in this part of region it was revealed that maximum percentage of the population have blood group O (48%) followed by B (23%).

Keywords: Diabetes Mellitus; ABO group; Rh group.

PP-C-07

Hematological Changes in Cement Factory Workers of Bagalkot

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Background: Hazardous substances are distributed widely in ecosystems due to diverse human activities such as energy usage, industrial enterprises, agriculture, etc. The human hematopoietic system is extremely sensitive to environmental influences because of rapid synthesis and destruction of cells with consequent heavy metabolic demands.

Objective: This study was aimed at measuring some haematological parameters in workers occupationally exposed to cement dust in order to test the hypothesis that cement dust exposure may perturb these functions.

Design: This comparative cross-sectional study was carried out in 42 apparently healthy male workers exposed to cement dust for 2 years or more and aged between 24-60 years. They were matched with equal number of healthy unexposed males from the general population in terms of age, sex and smoking status. Haemoglobin concentration, packed cell volume, red blood cell, total white blood cell and platelet counts were obtained from 2ml of venous anticoagulated blood placed in an auto analyser (Sysmex KX-21, Japan). Statistical analysis was done using the unpaired t-test.

Results: Haemoglobin concentration, red blood cell count and packed cell volume decreased whereas the total white blood cell and platelet counts increased in exposed as compared to unexposed subjects.

Conclusions: These results suggest that occupational exposure to cement dust may perturb hemopoietic functions and hence regular evaluation in this regard is to be done to prevent further serious outcomes.

Keywords: Hematological changes; Occupational exposure; Cement dust.

PP-C-08

Glucose-6-phosphate Dehydrogenase (G6PD) Status in Neonatal Jaundice and its Relationship with Severity of Hyperbilirubinemia

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Background: G6PD deficiency is one of the common inherited enzymatic disorder associated with a high incidence of severe neonatal hyperbilirubinemia.

Objective: To observe G6PD status in male, term neonates with jaundice and its correlation with serum bilirubin level.

Design: Cross sectional study was conducted on 90 male, term neonates with jaundice (Group B) and 30 healthy neonates (Group A); age ranging from 3 to 12 days between July 2007 to June 2008. Study group

(Group B) was further divided into B1 (TSB <15 mg/dl), B2 (TSB 15-20 mg/dl) and B3 (TSB >20 mg/dl). Erythrocyte G6PD level was measured by the Spectrophotometric method using kit of Randox.

Results: G6PD deficiency was noted in 7.7% of the study group. The deficiency was higher in the severe hyperbilirubinemia group. The enzyme level was significantly lower in the moderate ($p < 0.01$) and severe ($p < 0.001$) hyperbilirubinemia groups in comparison to that of the control group (group A). No enzyme-deficient patient was found in the control group and the mild hyperbilirubinemia group (B1). Serum bilirubin levels showed significant ($p < 0.05$) positive ($r = +.429$) correlation with the erythrocyte G6PD level in the control group. On the other hand, this level was negatively correlated with the G6PD enzyme in groups B1 ($r = -.127$), B2 ($r = -.120$) and B3 ($r = -.671$). Significant negative correlation was noted in group B3 ($p < 0.01$).

Conclusions: The results suggested that the severity of hyperbilirubinemia depends on the degree of G6PD deficiency.

Keywords: G6PD; Neonate; Hyperbilirubinemia.

PP-C-09

Changes in Osmotic Behavior of RBC in Normal Pregnancy with and Without Anemia

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Background: The osmotic behavior of RBC may change during different trimesters in normal pregnancy with and without anemia.

Objective: To observe the changes in the osmotic behavior of RBC during the first and third trimesters of normal pregnancy with and without anemia.

Design: A total of 48 women, age ranging from 18-38 years were studied. They included healthy, non-pregnant, nulliparous women (control) and normal pregnant women with and without anemia (study). Each group consisted of 16 women. Both groups of pregnant women were studied during the first and third trimesters.

Results: Osmotic fragility remains almost same in the first trimester and significantly higher in the third trimester of normal pregnancy without anemia compared to that of non-pregnant women. This may be due to hormonal effects and reduced plasma colloid osmotic pressure. The osmotic fragility was significantly lower in the first and third trimesters of normal pregnancy with anemia compared to that of non-pregnant women and pregnant women without anemia. However, osmotic fragility was increased significantly in third trimester of normal pregnancy without anemia but was nonsignificant in pregnancy with anemia compared to those of their first trimester.

Conclusions: Changes in the osmotic behavior of RBC occur during normal pregnancy with and without anemia, but it is more marked in pregnancy with anemia.

Keywords: Osmotic behavior; RBC; Pregnancy; Anemia.

PP-C-10

A Comparative Study to Determine The Incidence of Pancytopenia Among the Different Ethnic Groups in Balochistan and Afghanistan

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Background: Pancytopenia is a reduction in all the three types of cellular components present in the peripheral blood. This reduction causes anemia, neutropenia and thrombocytopenia.

Objective: The aim of the present study was to determine -

a. The incidence of pancytopenia among the different ethnic groups in Balochistan and Afghanistan.

b. To develop a correlation between pancytopenia and its predisposing factors.

c. To determine the treatment modalities and the response to them among the different ethnic groups.

Design:

1. The proposed study was conducted in Sandeman Provincial Hospital, CMH, Quetta.

2. Patients diagnosed with pancytopenia and admitted for a specific period of 3 to 4 months to the medical units of the hospital were included in the study.

Results: Majority of the patients with pancytopenia (50%) were Pushtoons, both from northern Balochistan and Kandahar, Hillmund (Afghanistan). They were followed by Baloch (34%) and Hazara (8%), ethnic groups of Quetta and Kandahar. The most common causes of pancytopenia in Pushtoons were malaria (40%) and leukemia (40%). Malaria was observed as the major cause of pancytopenia in other communities such as Baloch (47%) and Hazara (100%). Malaria/ Leukemia was also observed as the sole cause of pancytopenia in Uzbak, Tajak and Mughul communities.

Keywords: Pancytopenia; Balochistan; Afghanistan.

PP-C-11

Frequency of Blood Group Occurrence in Pregnant Women

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Background: This study was carried out to determine blood groups and frequency distribution of blood type in pregnant women to evaluate emergency transfusion needs.

Design: Blood groups were determined using A, B and D antisera (Gamma Biological Inc.) by the slide method. Results were observed within the first one to two minutes, before it dried up. The proforma was designed to record ABO and Rh(D) details, age and information about their own blood groups. This cross-sectional study was performed at the Gynecology Units I, II and III of Civil Hospital, Liaqut University, Hyderabad.

Results: This study was carried out to check for the distribution of ABO and Rh(D) blood groups in pregnant women. Among a total of 600 pregnant women, the percentage distribution of A, B, AB and O blood groups was found to be n = 114 (19%), n = 126 (21%), n = 33 (5.5%) and n = 327 (54.5%) respectively. Frequencies of A, B and O alleles were 0.1191±0.0192, 0.03639±0.0227 and 0.7382±0.012 respectively. Also, among these women, n = 558 (93%) were Rh+ve with a frequency of 0.7256±0.000505, while n = 42 (7%) were Rh-ve with a frequency of 0.2744±0.017736.

The distribution of ABO and Rh(D) blood groups was also studied in the general population comprising of 6078 individuals (non-pregnant women). Among these 6078 women, the percentage distribution of A, B, AB and O blood groups was found to be n = 1166 (19.18%), n = 1439 (23.68%), n = 438 (7.21%) and n = 3035 (49.93%). Frequencies of A, B and O alleles were 0.125±0.005565, 0.151±0.00579 and 0.706±0.004476 respectively. The Rh+ve were n = 5803 (95.5%) with a frequency of 0.782±0.002559 and the Rh-ve were n = 275 (4.50%) with a frequency of 0.218±0.022288. 90% of the general population were unaware of their own blood groups.

Conclusions: The trend of prevalence of ABO is noted to be O > B > A > AB among pregnant women. The same pattern was noted in the general population as well. According to statistical analysis the Chi-square contribution is $X^2_{(3)} = 6.192$ and p value comes out to be 0.01.

Keywords: ABO and Rh (D) blood groups; Allelic frequencies.

PP-C-12

A Study of Differential Leukocyte Counts During Different Phases of The Menstrual Cycle

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Background: The menstrual cycle occurs during the reproductive life of a woman. There is a variation in the estrogen and progesterone levels in the blood during the menstrual cycle, which may affect the distribution of immune cells in the peripheral blood.

Objective: To detect any variation in the differential leukocyte counts (DLC) during different phases of the menstrual cycle.

Design: Longitudinal study. Blood samples were collected from thirty healthy female medical students (18-20 years) with regular menses, for 3 consecutive menstrual cycles in the menstrual (1-2 days), proliferative (8-10 days) and secretive phases (22-24 days). DLC was done by the tally-bar method. Results were statistically analysed.

Results: In the menstrual phase, the values were - Neutrophil - 68.34±3.9; Lymphocyte - 27.24±2.86; Monocyte - 2.76±1.04; Eosinophil - 1.68±0.92. In the proliferative phase, Neutrophil - 66.32±3.34; Lymphocyte - 30.0±2.78; Monocyte - 2.84±1.66; Eosinophil - 0.8±0.89. In the secretive phase, Neutrophil - 67.88±4.02; Lymphocyte - 26.76±6.08; Monocyte - 2.92±1.79; Eosinophil - 1.56±1.23. There was no significant difference among the values, except the lymphocyte count which rose significantly during the proliferative phase as compared to the menstrual and secretive phases ($p < 0.01$).

Conclusions: All the counts except the lymphocyte count increased during the secretive phase which may be due to increased 17-ß-estradiol concentration. This study was a moderate attempt to determine regular variations in DLC during different phases of the menstrual cycle.

Keywords: Menstrual cycle; Leukocyte; Estrogen; Progesterone.

PP-C-13

Platelet Aggregation, Plasma Fibrinogen Level and Euglobulin Clot Lysis Time in Male Hypertensive Patients

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Background: Clinically, hypertension is associated with high chances of developing cardiovascular diseases prematurely through acceleration of 'Atherosclerosis'. In the recent years, it has become increasingly evident that components of the coagulation and fibrinolytic pathways are primary and secondary predictors of cardiovascular events.

Objective: The purpose of the study was to find out platelet aggregation, plasma fibrinogen level and Euglobulin clot lysis time in hypertensive patients

Design: Fifty male hypertensive and normotensive subjects in the age group of 35-75 years were included in this study. Platelet aggregation was estimated by the method given by 'O Brien JR'; plasma fibrinogen and euglobulin clot lysis time were measured by the method given by Fearnely et al and Wootton respectively. The three parameters were compared according to the age group and according to the duration of history of hypertension.

Results: Platelet aggregation and plasma fibrinogen level showed a significant increase in all age groups when compared with controls, but was not significantly associated with the duration of hypertension. Euglobulin clot lysis time showed a statistically significant decrease (increase in fibrinolysis) when compared with age-matched controls and a significant increase (decrease in fibrinolysis) when compared according to the duration of history of hypertension.

Conclusions: The increase in platelet aggregation and plasma fibrinogen level in all age groups is suggestive

of the thrombotic state in hypertension, while the highly significant increase in Euglobulin clot lysis time (decrease in fibrinolysis) is suggestive of increased thrombotic complications as the duration of hypertension increases.

Keywords: Hypertension; Platelet aggregation; Euglobulin clot lysis time; Plasma fibrinogen.

PP-C-14

A Study of Platelet Count in Pregnancy and Labour

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Background: Platelets are a key element of the blood coagulation process. Abnormal platelet count is one of the major causes of hemorrhage in pregnancy, labour and puerperium. Hemorrhage due to an abnormal platelet count is responsible for more deaths than other uterine causes.

Objective: The present study has been undertaken to find out if there is any quantitative change in the platelet count in women during pregnancy and labour as compared to non-pregnant, healthy women.

Design: Three groups of women were considered for this study - fifty healthy adult women (control group), fifty pregnant women (28 to 40 weeks of gestation) and fifty women in labour. The platelet count was measured by the "Breecher and Cronkite" method and the results were calculated and statistically analyzed.

Results: The mean platelet count of the non-pregnant, pregnant and in labour women was found to be 2.396±0.408 lacs/cumm of blood, 2.331±0.419 lacs/cumm of blood and 2.13±0.379 lacs/cumm of blood respectively. Statistically, the values of non-pregnant to pregnant was not significant (p-value <0.05). However, the non-pregnant to labour and the pregnant to labour values were found to be highly significant (p-value is <0.001 and <0.01 respectively).

Conclusions: In the present study, the platelet count was found to be low in pregnancy and labour as compared to the non-pregnant state. This decrease in platelet count may affect maternal health. To avoid this serious outcome, all tests for coagulation effectiveness must be done.

Keywords: Platelet; Pregnancy; Labour; Hemorrhage.

PP-C-15

A Simple Imaging Method for Demonstrating Red Cell Sizes to Life Sciences Students

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Background: The red cell size is described in nanometers. For a novice, it is difficult to imagine the cell size. Measuring the cell size requires the use of advanced instruments which in turn mandates the use of trained personnel.

Objective: To measure the red cell size uses a custom-built microscope camera and computer-based image analyzing software.

Design: Sixty peripheral blood smears were photographed using a microscope camera. The images were stored in a computer. The retrieved images were measured offline using the software. Two independent observers recorded the red cell sizes of both randomly selected and tagged red cells in each slide.

Results: The mean red cell width of the tagged red cells as measured by the first and second observer was 7.70-7.82 (±0.61μ) and 7.71-7.76 (±0.61μ) respectively. The mean red cell width of the untagged red cells as measured by both the observers ranged between 7.49-7.67 (±0.54μ) and 7.34-7.44 (±0.60μ). The intraclass correlation coefficient for interrater &

intrarater reliability is 0.956 (observer 1) and 0.944 (observer 2) for tagged red cell width and 0.723 (observer 1) and 0.730 (observer 2) for untagged red cell width.

Conclusions: The computer-based image analysis method to determine the red cell size provides an accurate and reliable measurement that is simple and cost effective. This method can be used to demonstrate measurement of red cell width to life sciences students in the setting of hematology practicals.

Keywords: Cell width; Image analysis; Microscopic measurement; Red blood cell.

PP-C-16
Association Between ABO Blood Groups and Patients with Pregnancy Induced Hypertension

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Background: There has been a gradual rise in the incidence of pregnancy-induced hypertension over the last few decades. Hypertensive disorder of pregnancy affects up to 8% of all gestations. PIH still remains a disease of theories as its cause is not yet fully established. Certain pathological conditions such as gastric carcinomas, gastrointestinal bleeding complications, ischemic heart disease and thromboembolic events have been found to be associated with the ABO or rhesus blood groups.

Objective: To know the relationship between PIH and maternal blood groups.

Design: The present study included 200 cases of PIH. All the cases were selected from, ANC, labour room and inpatient ward of OBGY department, Pravara Rural Hospital, Loni. Blood groups were determined by using glass slides.

Results: Blood group AB increased the risk for PIH as a whole (OR 2.0, 93% CI 1.2 - 3.3).

Conclusions: Our results confirm and extend the prior observation of blood group AB being a risk factor for PIH. ABO blood group is known from all pregnant women. The value of blood group as risk factor for PIH should be further assessed in prospective studies.

Keywords: ABO blood groups; AB blood group; Pregnancy-induced hypertension, Risk factor.

FC-D-01
Study on the Hepatoprotective Effect of Oyster Mushroom (Pleurotus Florida) Against Paracetamol-induced Liver Damage in Wistar Albino Rats

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Background: Liver protective drugs are not available in modern medicine. Many hepatoprotective herbal medicines are often used in the treatment of liver damage.

Objective: This experimental study was carried out to observe the hepatoprotective effect of oyster mushroom (Pleurotus florida) against paracetamol-induced liver damage in Wistar albino rats.

Method: This experimental study was carried out in Dhaka from 1st July 2009 to 30th June 2010. A total number of 34 Wistar albino rats, age ranged from 90 to 120 days, weighing between 150 to 210 grams were selected for the study. After acclimatization for 14 days, they were divided into two groups: control group (Group A) and experimental group (Group B - mushroom pre-treated and paracetamol treated group). Control group was again subdivided into group A_1 (baseline control) and group A_2 (paracetamol treated group). All groups of animals received basal diet for 30 consecutive days. Group A_1 which consisted of 10

rats received propylene glycol (2 ml/kg bw, po) only on the 30th day. Group A_2 consisting of 14 rats received a single dose of paracetamol suspension (750 mg/kg bw, po) only on the 30th day. Group B (10 rats), received mushroom extract (200 mg/kg bw, po) for 30 consecutive days and paracetamol suspension (750 mg/kg bw, po) only on the 30th day. All the animals were sacrificed on the 31st day. Blood and liver samples were collected. Measurement of liver marker enzymes and total bilirubin level in serum as well as the assessment of malondialdehyde concentration in the liver tissue homogenate were done using standard laboratory kits. Histology of the liver was also assessed. The statistical analysis was done by one-way ANOVA and Bonferroni test as applicable.

Result: The mean serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), total bilirubin and the liver tissue homogenate malondialdehyde (MDA) concentration were significantly ($p < 0.001$) higher in paracetamol treated group in comparison to those of the baseline control group. In addition, the mean serum AST ($p < 0.05$), ALT ($p < 0.05$), total bilirubin ($p < 0.001$) and the liver tissue homogenate MDA concentration ($p < 0.001$) were significantly lower in mushroom pre-treated and paracetamol treated group (experimental group) when compared to those of paracetamol treated group (control). In this study, the histological examination of liver revealed abnormal histological findings in 100% of rats in the paracetamol treated rats. 80% of rats in mushroom pre-treated and paracetamol treated group showed almost normal structure while 20% showed mild histological changes in liver.

Conclusions: The present study demonstrated the hepatoprotective effect of oyster mushroom (Pleurotus florida) against paracetamol-induced liver damage in Wistar albino rats.

Keywords: Oyster mushroom, Pleurotus florida, hepatoprotective herbal medicines Paracetamol-induced liver damage.

FC-D-02

Gender Difference in the Ventromedial Hypothalamic Regulation of Food Intake and Body Weight in Rat Model: Correlation with Lipid and Thyroid Profiles and Insulin Resistance

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Background: Brain areas such as the ventromedial hypothalamus (VMH), lateral hypothalamus, amygdala, etc. are known to influence food intake and body weight. Though obesity is more common in females, the reports on gender difference in the VMH regulation of energy homeostasis are not adequate.

Objective: The present study was conducted to study the gender difference in the effect of VMH lesion on food intake (FI), body weight (BW), lipid profile, thyroid profile, glucose and insulin levels in serum and glucose-insulin ratio (GIR) in Wistar albino rats.

Design: Twenty four Wistar albino rats were divided equally into control and experimental groups, with 6 male and 6 female rats in each. In the experimental group, bilateral electrolytic lesion of VMH was performed by stereotaxy and the post-lesion parameters were recorded. In the control group, VMH sham lesion was made. Male-female difference in each parameter was determined.

Results: Following VMH lesion, there was an increase in FI (female $p < 0.01$) and BW (male $p < 0.05$). GIR decreased in males ($p < 0.001$) with significant correlation with BW. T3 was more significantly correlated with FI and BW in females (female $p < 0.000$ and male $p < 0.001$).

Conclusions: Following VMH lesion, male rats exhibited significant weight gain without significant

hyperphagia indicating that it could be metabolic in nature. Also, the male rats became more susceptible for insulin resistance. The female rats, on the other hand, showed more resistance to body weight gain in spite of hyperphagia which may be due to the higher T3 level.

Keywords: Lesion of ventromedial hypothalamus, Gender difference, Food intake, Obesity.

FC-D-03
Protective Effect of *Aegle Marmelos* in Ameliorating Oxidative Stress in Experimental Models of Peptic Ulcer

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Background: Reactive oxygen species (ROS) plays a major role in causing oxidative damage of mucosa in almost all types of ulcers. Natural flavonoids present in plants are known for scavenging effects on reactive oxygen radicals.

Objectives: This study was undertaken to evaluate: the role of aqueous extract of ripe fruit pulp of Aegle marmelos (AM) in the prevention of oxidative stress generated during ulcer in experimental animals by the administration of a single high dose of aspirin (ASP), the lesion of the cerebellar-nodular area (CNL) and the exposure of the rats to cold-restraint stress (CRS).

Study design: We examined antioxidant status [superoxide dismutase (SOD), catalase (CAT), tissue lipid peroxidation (LPO) and glutathione (GSH) level] in the gastroduodenal tissue of Holtzman strain adult male albino rats (weighing 175 – 210 g). AM was given orally at a dose of 250 mg/kg for 14 consecutive days before subjecting the rats to ulcerogenesis.

Results: AM enhanced the rate of prevention of ulcer in all types of ulcers in the stomach (93% in ASP, 87% in CNL & 66% in CRS) and duodenum (82% in ASP, 69% in CNL & 56% in CRS). LPO level was increased in ulcerated rats, a change significantly attenuated by AM. AM attenuated oxidative stress by increasing SOD activity in both stomach (63% in ASP, 72% in CNL & 32% in CRS) and duodenum (47% in ASP, 78% in CNL & 28% in CRS). CAT activity was not significantly altered in CNL & CRS models by AM pre-treatment. AM altered glutathione level in gastroduodenal tissue in ASP & CRS models upon but no significant change was observed in CNL model.

Conclusions: In general, the results of the present investigation revealed the gastroprotective activity of the extract by an in vivo free radical scavenging action.

Keywords: Antioxidants; Free radicals; Ulcer healing; Gastric lesion; Aegle marmelos.

PP-D-04
Prevalence of Irritable Bowel Syndrome in Adult Asthmatics

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Background: Irritable bowel syndrome (IBS) is a common and socially crippling disorder of the gastro intestinal tract. Increasing prevalence of IBS has been shown among asthmatics, thus suggesting a link between these two conditions.

Objective: To estimate the prevalence of irritable bowel syndrome in asthmatics and to explore the association and symptom characteristics of IBS among asthmatics.

Design: Cross-sectional study; Materials and Methods - In a tertiary center, 86 patients aged 20 - 65 years,

with asthma, diagnosed clinically and by spirometry, were selected and were administered a questionnaire for irritable bowel syndrome (ROME II criteria). Subjects with a H/O celiac disease, colitis and colon cancer were excluded. The data was analyzed using SPSS software. Prevalence rates were expressed as percentage and Chi-square test was used for comparisons.

Results: The overall prevalence of IBS in asthmatics was 33.5%. A higher proportion of females (39%) had IBS when compared to men (28%), though not statistically significant. Increased prevalence of IBS among asthmatics could be because of the primary hyper vagal responsiveness, smooth muscle dysfunction and an alteration in immune function.

Conclusions: The higher prevalence of IBS in asthmatics suggests that both bronchial asthma and IBS might be subsets of the same entity. This is of relevance to clinicians in that diagnosis of either condition should prompt investigation for the other, which in turn will pave way for better health care.

Keywords: Irritable bowel syndrome; Asthmatics.

PP-D-05
Effect of Curcumin on Gastric Emptying in Albino Rats

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Background: Turmeric (Curcuma Longa) is a medicinal plant extensively used in Ayurvedic, Unani and Siddha medicine as a home remedy for various diseases including biliary diseases, cough, hepatic diseases and wound healing. Studies in humans and in experimental animals have shown the beneficial effect of curcumin on the function of the gastrointestional. However, studies on the effect of curcumin on gastric emptying are nearly nonexistent.

Objective: To see the effect of curcumin on gastric emptying.

Design: Rats were divided into 5 Groups (Group I – Group V) based on the time interval between the administration of curcumin/vehicular fluid to the administration of barium sulphate (Group I- 1hr, Group II - 8hrs, Group III - 16 hrs, Group IV - 24 hrs, Group V - 48 hrs). Each group was further divided into two subgroups: Group A (control) and Group B (experimental), containing 6 rats. In the experimental group, curcumin was administered intragastrically in the dose of 1 gm/kg body weight, suspended in normal saline (0.9% Nacl). The controls were given vehicular fluid intragastrically in the same dose. After the requisite time interval, as per group, rats in the control and experimental groups were administered barium sulphate suspension. After 30 minutes, the stomach was cut open and washed for its luminal content into a beaker containing normal saline, centrifuged and the weight of the luminal content was measured.

Results: After intragastric administration of a single dose of curcumin, there was a decrease in the gastric emptying in all experimental groups.

Conclusions: Curcumin decreases gastric emptying. However, limited information exists about the mechanism by which it delays gastric emptying.

Keywords: Curcumin; Vehicular fluid; Gastric emptying; Barium sulphate.

FC-E-01
Dolichos Biflorus Ameliorates Diabetic Nephropathy

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Background: Dolichos biflorus seed used in ayurvedic medicine is a known antilithiatic, hypolipidemic and has free radical scavenging activity.

Objective: The study was conducted to investigate the effects of daily feeding of dolichos biflorus for 30 days on blood glucose and kidney functions in streptozotocin (STZ) diabetic rats.

Design: Twenty four healthy rats were randomly grouped into control, diabetic and diabetic on dolichos groups. Diabetes was produced by single intravenous dose of STZ and confirmed by blood sugar assessment on the 3rd day. Dolichos was given daily at doses of 300 mg/ kg to rats in the diabetic on dolichos group for 30 days. Plasma glucose levels and body weight were monitored at the beginning, on the 3rd and the last day of treatment. Assessment of serum creatinine levels and the histopathological study of kidney were carried at the end of the treatment. Renal hypertrophy was assessed as the ratio between the kidney weight and the total body weight.

Results: Plasma glucose concentrations in STZ-diabetic rats were reduced by the administration of dolichos biflorus ($P < 0.001$). Observations indicated improvement in serum creatinine after treatment with dolichos. Histologically, glomerular sclerosing and decreased bowman's space with interstitial alterations were evident in the diabetic rats but were decreased in diabetic rats fed with dolichos. Renal hypertrophy was significantly higher in diabetic rats as compared to controls. Dolichos biflorus significantly prevented renal hypertrophy in diabetic rats ($P < 0.001$).

Conclusions: Dolichos biflorus at doses of 300 mg/ kg/day for 30 days decreased the glomerular and interstitial alterations in diabetic kidney and therefore can be effective in diabetic nephropathy.

Keywords: Dolichos biflorus; Experimental diabetes; Streptozotocin; Diabetic nephropathy.

FC-E-02

Effect of SRCT (Salacia Reticulata W. and Clitoria Ternatea L.), A Polyherbal Formulation on Cognitive Impairment and Behavioural Changes in Streptozotocin Induced Diabetes of Early Onset in Rats

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Background: Children with type 1 diabetes of early onset have repeatedly been reported to show deficits on a wide range of neuropsychological tests compared with non-diabetic subjects. However, the contribution of the polyherbal formulations with respect to cognitive dysfunction is unresolved and less documented, which is very much the need of the time, especially in India - the diabetes capital of the world with millions of diabetics.

Objective: To determine the effect of SRCT, the herbal therapy on hyperglycemia induced cognitive and behavioral changes in streptozotocin induced young diabetic rats.

Design: Diabetes was induced in young, 25 days old Wistar rats, by streptozotocin (50 mg/kg bw, IP injection). Fasting blood sugar (FBS) level and bodyweight were measured regularly. Rats were daily fed with alcoholic root extracts of SR and CT (100 mg/kg BW each) for 30 days, from the day 1 of diabetes confirmation (preventive group) and after 30 days of diabetes (curative group). The rats were then tested for cognitive and behavioral changes in elevated plus maze, passive avoidance and Morris water maze, along with the age matched control rats.

Results: SRCT therapy helps to decrease FBS significantly, in both preventive and curative group of

rats. However, significant improvement is observed only in the learning and memory among the preventive group, but not in the curative group.

Conclusions: SRCT, a herbal formula has more potent effect when used as a preventive measure rather than curative. Further advanced studies will help to evaluate the role of herbal therapies in the correction of cognitive deficits among diabetic children and aged population.

Keywords: Learning and memory; Juvenile diabetes; Streptozotocin; Salacia reticulata; Clitoria ternatia.

FC-E-03
Endocrine Profile and Skeletal Health

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Background: Vitamin D is an important hormone necessary not only for maintaining calcium balance but also has a profound effect on the skeletal growth and development. Peak bone mass is influenced by genetic, nutrition, lifestyle and hormonal factors. High prevalence of hypovitaminosis D is being increasingly recognized globally. In India, there are epidemiologic studies indicating the prevalence of hypovitaminosis D in the population. However, at high altitude there is no information available about bone health.

Objective: To investigate the effect of residency at high to extreme altitude on bone turnover.

Design: The present cross sectional study was conducted to evaluate the skeletal health of Indian army in the age range of 18 - 55yrs by quantitative ultrasound using the SOS determination. The study was conducted in different phases and at the respective Army unit of postings of the soldiers: Phase I at sea level (SL), Phase II at high altitude (HA) of 3300m - 3500m, Phase III at HA of 3700 - 4300m and Phase IV after coming back from the extreme altitude (EA) of 5500m - 6700m. Estimation of serum calcium, phosphorous, alkaline phosphatase and hormones such as intact parathyroid hormone and 25-OH Vitamin D_3 were carried out in blood samples collected during different field trials.

Results: SOS and T-score showed an increase with increased age and peaked in mid-life. A decline in bone strength followed thereafter. Both at HA and EA, bone impairment was detected at proximal phalanx. Proximal phalanx is known to undergo early morpho-structural changes associated with bone resorption. At HA among the indices of bone metabolism, serum calcium and alkaline phosphatase level showed a significant rise both at Phase II and Phase III. However, a decline was found after staying at EA (Phase IV). The serum 25 OH Vit D3 did not show any significant change at Phase II as compared to SL but showed a significant decline both at Phase III and Phase IV. Serum PTH was significantly higher at Phase IV as compared to Phase II and III.

Conclusions: Vit D3 deficiency was reported earlier in Indian population. However, in our data Vit D3 levels were found within the normal range both at SL as well as HA though it was at a lower side of the normal range at extreme altitude. Military population due to their routine exercise, proper diet, sufficient exposure to sunlight and annual medical checkups could maintain optimal Vit D3 level. Environmental factors such as low temperature, lesser dermal exposure to sunlight, lesser cellular oxygen and consequential anorexia might be contributing significantly towards the poor bone health status at HA.

Keywords: Skeletal growth and development; Vitamin D3 deficiency.

PP-E-04
The Influence of Gestational Diabetes Mellitus on Fetal Weight

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Background: Gestational diabetes has an effect on fetal mortality. Our study attempts to examine the effects of gestational diabetes mellitus on fetal development.

Objective: To evaluate the influence of gestational diabetes on fetal weight and development.

Design: Serial ultrasonograms of 30 patients with gestational diabetes mellitus (GDM) were compared with 30 controls. They were in the age group of 18 to 34 years and 28 to 40 weeks gestation. Gestational diabetes mellitus was diagnosed during pregnancy by the measurement of post prandial plasma glucose (PPBS) levels. Serial ultrasonograms were done in the I, II & III trimesters. Neonatal birth weights were recorded. Ultrasound measurement of the fetal head circumference & abdominal circumference were also obtained.

Results: Prediction of fetal weight was assessed by Dr. Woo's formula. Statistically all parameters in the 2 groups were found to be significantly different. The PPBS was higher in GDM (146.0±11.3 gms, Controls; 95.2±14.4 gms/100 ml, $p < 0.0001$), the birth weight was higher in GDM group neonate (3.9±0.1 kg, in Controls; 34.2±2.4 cms, $p < 0.0001$) and the neonatal head circumference (GDM group - 35.4±1.7 cm, Controls - 33.3±0.9 cm $p < 0.001$) was also significantly increased in the GDM group.

Conclusions: This study concludes that screening of all pregnant women must be done by regularly monitoring blood glucose levels and estimating fetal weight by ultrasound in the I, II & III trimesters to prevent neonatal maternal complications.

Keywords: Gestational diabetes mellitus; fetal mortality.

PP-E-05

The Relationship of Parasympathetic Nerve Function Parameters with Endogenous Estrogen Level in Postmenopausal Women

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Background: The increased risk of cardiovascular diseases in postmenopausal women may be due to a decreased level of estrogen in this period of life.

Objective: This study was carried out to observe the relationship of estrogen with parasympathetic nerve function parameters.

Design: This cross-sectional study was carried out in the Department of Physiology at Bangabandhu Seikh Mujib Medical University, Dhaka from January 2007 to December 2007. Sixty subjects were selected; 30 were postmenopausal women aged between 45 to 60 years (study group) and 30 were premenopausal women aged between 20 to 30 years (control group). Premenopausal women were studied during the follicular phase of the menstrual cycle. Serum estrogen level was measured in each subject by MEIA method and the parasympathetic nerve functions were evaluated by three non-invasive cardiovascular reflex tests.

Results: Estrogen level was significantly ($p < 0.001$) lower in postmenopausal women than that of premenopausal women. Parasympathetic nerve function parameters such as heart rate response to deep breathing and heart rate response to standing were significantly ($p < 0.001$ and $p < 0.01$ respectively) lower in postmenopausal women then premenopausal women. In addition, valsalva ratio, heart rate response to deep breathing and heart rate response to standing showed significant positive correlation with serum estrogen level in postmenopausal women. On regression analysis, the parasympathetic nerve function in postmenopausal women showed a significant association with estrogen level.

Conclusions: From this study it may be concluded that parasympathetic nerve function was lower in postmenopausal women, which may be related to a decreased level of estrogen.

Keywords: Postmenopausal women; Estrogen; Parasympathetic nerve function.

PP-E-06

Impact of Stress on Menstrual Pattern of Medical Students

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Background: Studies have shown significant influence of stress on endocrine and reproductive health. As medical students are under higher academic pressure, the resultant stress, fatigue and mood changes may affect their menstrual cycle.

Objective: This study was done to determine the prevalence of menstrual abnormalities and irregularities among medical students and to correlate them with the level of stress perceived by medicos compared to that in non-medical students.

Design: A case control study was conducted among age matched 50 medical students (cases) and 50 non-medical students (control). Each group was administered sets of validated questionnaires evaluating for variations in menstrual patterns such as length of cycle, duration of bleeding period, blood loss per cycle, dysmenorrhea, pre-menstrual tension and the level of perceived stress.

Results: Both groups were similar in baseline characteristics. Significantly higher number ($p = 0.046$) of medicos suffered from premenstrual symptoms as compared to non-medical students. Medical students also reported a higher level of stress and menstrual problems like passage of clots, missed periods and dysmenorrhea.

Conclusions: The study shows that the level of stress is more in medicos which may be unknowingly manifested as menstrual disturbances. Hence, there is an urgent need to increase awareness of these variations, which if untreated and undiagnosed, may lead to greater problems such as infertility later on.

Keywords: Pre-menstrual tension, Stress.

PP-E-07

Association of Waist Circumference with Glycemic Control in Healthy Adults

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Background: Diabetes mellitus is one of the common causes of morbidity and mortality in India. It is a multifactorial disorder with obesity as one of the risk factors. The risk is more with central obesity than peripheral distribution of fat. The waist circumference measures central obesity and glycated hemoglobin concentration (HbA1c) reflects long term glycemic control.

Objective: To investigate the association of waist circumference with HbA1c.

Design: Forty seven healthy subjects (M:F - 23:24) in the age group of 45 to 70yrs (53±5yrs) were recruited for the study. The waist circumference was measured. HbA1c was estimated by chromatography. Pearson's correlation co-efficient was calculated to study the association between the parameters measured.

Results: The mean and standard deviation of waist circumference and HbA1c were found to be 89.4 (±8.3cm) and 6.0 (±1.0%) respectively. Though not significant, a positive association between HbA1c and waist circumference ($r = 0.05$, $p = 0.76$) was observed which needs to be confirmed with larger sample size.

Conclusions: Positive association between waist circumference and HbA1c indicates that increased waist circumference is associated with poor glycemic control. Therefore, interventions and life style modifications to reduce the waist circumference will help in preventing diabetes and its complications.

Keywords: Waist circumference; HbA1c.

PP-E-08

A Study of Relation Between Anthropometric Measurements and Lipid Profile

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Background: Excess body fat is a risk factor for premature development of diabetes and cardiovascular disease. Therefore, to develop preventive strategies, there is a need to understand the relation between measures of adiposity such as BMI, waist circumference, waist-hip ratio & skin fold thickness and cardiometabolic risk factors such as serum lipid profile.

Objective: To study the relation of waist circumference, waist-hip ratio, skin fold thickness and BMI with serum lipid concentrations.

Design: The study included 100 healthy subjects between 20 - 60 years of age, excluding diabetics and those on lipid lowering agents. Ethical clearance was obtained. Waist circumference was measured at the mid-point between lower ribs and iliac crest by using non-stretchable measuring tape. BMI (kg/m^2) was calculated. Skin fold thickness was assessed using skin calliper. Lipid profile of the subjects was done. Waist circumference (WC), BMI, waist hip ratio (W/H) and skin fold thickness (SFT) were correlated individually with lipid profile and with each other.

Results: Serum cholesterol had significant positive correlation with WC ($r = 0.747$), total SFT ($r = 0.671$), W/H ($r = 0.583$) and BMI ($r = 0.537$). Similar significant positive correlations were observed between anthropometric measurements and LDL, triglyceride and LDL/HDL ratio. The anthropometric measurements had a positive correlation with each other.

Conclusions: The correlations were higher for waist circumference compared to the other anthropometric measurements. Hence, waist circumference is the best predictor of lipid profile and the most important risk factor for cardiometabolic diseases.

Keywords: BMI, Waist circumference; Skin fold thickness; Lipid profile.

PP-E-09

Visual Evoked Potentials in Diabetes Mellitus

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Background: The deleterious effects of diabetes mellitus on the retinal, renal, cardiovascular and peripheral nervous systems are widely acknowledged. The pathophysiology of central nervous system (CNS) abnormalities in DM is not well understood. Electrophysiological investigation is a very sensitive method in determining central neuropathy in diabetic patients. VEP is a non-invasive examination method that facilitates the detection of early diabetic retinopathy changes, which is of great value in the prevention of blindness.

Objective: 1. To study the visual evoked potentials in diabetic patients. 2. To correlate between P100 latency and duration of diabetes.

Design: The study included 20 diagnosed diabetes mellitus type II patients of more than 2 years duration and without any complications like retinopathy, glaucoma, cataract, hypertension, etc selected from RL Jalappa Hospital, Kolar. 20 age and sex matched subjects were taken as the control group. Ethical clearance had been obtained. VEP was recorded using pattern reversal stimulation with EMG RMS PK2 machine.

Results: The P100 latencies were significantly prolonged in diabetic patients with a mean + SD of (110.14 + 5.30) as compared to controls (100.17 + 0.75) with p value <0.001. A significant positive correlation was found between the duration of diabetes and P100 latencies ($r = 0.63$; $p = 0.003$).

Conclusions: The prolongation of P100 latencies, which are observed in diabetics, is an expression of

structural damage at the level of the myelinated optic nerve fibers. The anterior visual pathways get involved in diabetic patients before the development of retinopathy and P100 latencies show significant positive correlation with the duration of diabetes.

Keywords: Diabetes Mellitus, Visual evoked potentials, P100 latencies, Central neuropathy.

PP-E-10
Random Serum Cortisol Levels in Subjects with Recurrent Aphthous Stomatitis

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Background: Aphthous ulcers or recurrent aphthous stomatitis (RAS) is one of the most common and painful disorders in young adults. Various hypotheses on the etiology of aphthous ulcers have been put forth but none are conclusive. Almost any type of stress causes an immediate increase in ACTH and cortisol secretion.

Objective: To measure the serum cortisol levels in young adults with RAS.

Design: Ten subjects in the age group of 18 to 30 years with RAS were recruited for the study from June 2010 to August 2010. After informed consent, random serum cortisol was measured using electrochemiluminescence immunoassay method (ECLIA).

Results: Random serum cortisol levels were found to be 10.08 + 2.38 µg/dL (mean + SD). The normal range is between 2 – 11 µg/dL. It is elevated in 3 subjects and is in the upper limit of the normal in 4 subjects. Thus, in this study random serum cortisol levels showed a trend towards the upper limit of the normal.

Conclusions: Random serum cortisol is in the upper limits of normal in 70% of subjects with RAS. This suggests that stress could be a predisposing factor for RAS.

Keywords: Recurrent aphthous stomatitis; Random serum cortisol; Stress; ECLIA.

PP-E-11
Comparision of Biochemical Indices Between Controls and Diabetics

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Background: NIDDM is emerging as a major public health problem. It accounts for 95% of all diabetics.

Objective: To compare the biochemical indices between controls & diabetics.

Design: The study was conducted in the department of Physiology & Medicine, KIMS, Hubli. 45 patients attending the diabetic clinic who were not on insulin & without any complications were taken. Equal no. of age & sex matched normal healthy controls were taken for the study. Complete lipid profiles & Bl. sugar levels were estimated.

Results: The FBS, PPBS, CH and TG were comparatively higher in the diabetic group. The HDL levels in the male & female diabetic patients were reduced.

Conclusions: Obesity related with NIDDM produces insulin resistance and hyperinsulinemia and plays a role in lipid & lipoprotein abnormalities in NIDDM.

Keywords: FBS-Fasting blood sugar, PPBS-Postprandial blood sugar, CH-Cholesterol, TG-Triglycerides.

PP-E-12

Autonomic Functions and Serum Leptin Levels in Normal Weight and Overweight Young Indian Females

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Background: A close association has been observed between autonomic functions and obesity. Leptin, secreted by adipose cells, acts centrally to decrease appetite and increase energy expenditure and it also possibly affects autonomic functions.

Objective: To study the relation between serum leptin and autonomic functions in normal weight and overweight females.

Design: For the study, 30 normal weight (BMI 20.98±1.19 kg/m^2) and 30 overweight (BMI 26.74±0.92 kg/m^2) females between the age group of 18 - 24 years were selected from the undergraduate students of institute, with prior consideration of inclusion and exclusion criteria. The resting heart rates, systolic and diastolic blood pressures (SBP and DBP) and the autonomic function tests were recorded in all subjects. For the parasympathetic functions, effect of deep breathing on RR interval - expiration/inspiration ratio (E/I ratio), effect of sudden standing on RR interval - 30th/15th beat (30/15 ratio) and Valsalva ratio (IVth/ IIth phase) were recorded; for the sympathetic functions, cold pressor test (CPT) and isometric exercise test were recorded. The serum leptin was measured by sandwich ELISA method.

Results: In the overweight subjects, there was a significantly higher leptin levels, higher resting heart rate, lower E/I ratio and significantly higher rise in SBP and DBP on CPT and isometric exercise stimuli, compared with the normal weight subjects. The serum leptin had a significant negative correlation with 30/15 ratio and a significant positive correlation with a rise in SBP in CPT.

Conclusions: The overweight subjects had higher serum leptin levels, higher sympathetic and lower parasympathetic activity than normal-weight subjects. Thus, higher leptin levels significantly correlate with higher sympathetic and lower parasympathetic activity.

Keywords: Autonomic functions; Leptin; Sympathetic; Parasympathetic.

PP-E-13

Study of Heart Rate Variability (HRV), Fasting Blood Sugar (FBS) and Lipid Profile in Subjects with and Without Parental History of Type 2 DM

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Background: Children of a parent with type 2 DM have an increased risk of diabetes; if both parents have type 2 DM, the risk approaches 40%. Increased sympathetic activation is found to be associated with reduced insulin sensitivity.

Objective: To compare the heart rate variability, fasting blood sugar and lipid profile in subjects with and without parental history of type 2 DM.

Design: Twenty three healthy subjects with a parental history of type 2 DM were taken as cases and 25 healthy subjects without a family history of type 2 DM were taken as controls. Instruments used included ECG machine (BPL Cardiart 1087/MK-V), analog-to-digital converter (National Instruments NI-DAQ 7.5 USBD 6008) and heart rate variability software (version 1.1). The blood sample for FBS and lipid profile were collected and analyzed by enzymatic method using ERBA diagnostic (Germany) kit.

Results: The average age of the controls was 20.80±1.50 years and the cases was 20.86±1.51

years. The anthropometric parameters like weight and body mass index (BMI) were comparable between the two groups. The results have shown comparable fasting blood sugar levels in both the groups. It was 84.16±4.50 and 82.69±5.10 mg% in controls and cases respectively. Lipid parameters also showed comparable values. Time domain variables such as SDNN, E:I ratio, pNN50 & rMSSD were comparable between the two groups.

Conclusions: Our study did not demonstrate any autonomic imbalance in children of type 2 DM. This may be because the subjects we included may be insulin sensitive.

Keywords: Heart rate variability; Lipid profile; Type 2 diabetes mellitus; Sympathetic activity.

PP-E-14

Correlation of Body Mass Index, Waist Circumference and Waist Height Ratio with Lipid Profile in First Degree Relatives with a Family History of Type 2 Diabetes Mellitus

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Background: Type 2 diabetes (T2D) is a complex metabolic condition characterised by insulin resistance and impaired insulin secretion. Both genetic and environmental factors such as a change in life style and physical inactivity contribute to the development of type 2 DM. Abdominal obesity is closely related to insulin resistance and is recognized as an independent cardiovascular risk factor.

Objective: To study the correlation between BMI, WC and WHtr with lipid parameters.

Design: This is a correlation study having a total of 50 subjects – with at least one parent having type 2 DM. Subjects include individuals of both genders in the age group of 18 - 25 years. Body mass index, waist-hip ratio, waist-height ratio and lipid profiles were correlated.

Results: In the present study, BMI, WC and WHtr were positively correlated with total cholesterol and LDL and negatively correlated with HDL/LDL ratio.

Conclusions: Thus, simple anthropometric measures such as BMI, WC and WHtr can be independently used for risk stratification among the younger age group who are at a high risk for development of type 2 DM. Therefore, these measurements either independently or along with lipid profile may be used as the objective evidence in the evaluation of the efficacy of preventive measures.

Keywords: First degree relative; Insulin resistance; Waist height ratio; Lipid parameters.

PP-E-15

Effect of Glycemic Control on Microalbuminuria in Type 2 Diabetics

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Background: Microalbuminuria is diagnosed either from a 24-hour urine collection (between 30 - 300 mg/day) or, from elevated concentrations in a spot sample (30 - 300 mg/L). Microalbuminuria is a strong predictor of nephropathy in type 2 diabetics. Excess dietary intake of carbohydrates has been shown to be an independent risk factor for microalbuminuria. Improved glycemic control, maintenance of normal blood pressure and the use of ACE inhibitors are important strategies to avoid the development of microalbuminuria.

Objective: This study was done to assess the association between glycemic control and microalbuminuria and its influence on renal parameters

such as blood urea nitrogen (BUN) and serum creatinine in type 2 diabetics.

Design: Sera from 40 type 2 diabetics with microalbuminuria (Group-1), 49 diabetics without microalbuminuria (Group-2) and 30 controls (Group-3) were analyzed for HbA1c, fasting blood sugar (FBS), post-prandial blood sugar (PPBS), blood urea nitrogen (BUN) and creatinine. Chi square test and Pearson's correlation test were used to compare and find the correlation between the groups. Statistical significance was fixed at p=0.05.

Results: In Group-1, there was a positive correlation between microalbuminuria and HbA1c ($p < 0.05$), FBS ($p < 0.001$) and PPBS ($p < 0.05$). However, there was no correlation between HbA1c, FBS, PPBS and microalbuminuria, BUN and creatinine values in the other two groups.

Conclusions: This study shows that there is a positive correlation between microalbuminuria and glycemic index in type 2 diabetics. Thus, effective glycemic control may play an important role in delaying the onset of diabetic nephropathy.

Keywords: Glycemic index; Type 2 diabetes; Microalbuminuria; Diabetic nephropathy.

PP-E-16
Hyperglycaemia and Insulin Resistance: What Comes First?

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Background: Classical explanation of diabetic pathophysiology states that insulin resistance develops first and is followed by compensatory hyperglycaemia. In contrast, neurobehavioral origin hypothesis predicts a reverse order, i.e., primary hyperinsulinnemia followed by compensatory insulin resistance.

Objective: To determine whether hyperglycemia develops or insulin resistance develops first in diabetes.

Design: We searched literature for studies that investigated the sequence of development of hyperglycaemia and insulin resistance in humans and animal models from an early stage. Meta-analysis was conducted on the published data.

Results: 1). In low birth weight neonates in humans as well as in rat models, hyperinsulinnemia was found at a very early stage. 2). Development of insulin resistance is preceded by hyperglycaemia in mice, rats as well as in humans. 3). In normoglycemic hyperinsulinemia state, if insulin production is suppressed insulin sensitivity increases rapidly maintaining the normoglycemic state.

Conclusions: All the three lines of evidence indicate that hyperinsulinemia precedes insulin resistance supporting the predictions of neurobehavioral origin hypothesis over the orthodox view.

Keywords: Hyperglycemia, Insulin resistance; glucose homeostasis; Neurobehavioral origins of metabolic syndrome.

PP-E-17
Correlation Between Glycosylated Hemoglobin and Reaction Time (Visual and Auditory) in Diabetics – A Cross-Sectional Study

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Background: With the focus on the worldwide epidemic – diabetes and aiming to reduce the morbidity due to neuropathy in diabetics, we used reaction time measurement as a tool to detect the neuropathy earlier and hence improve their quality of life.

Objective: To correlate HBAIc (glycosylated haemoglobin) values with visual and auditory reaction time in diabetics.

Design: Cross-sectional study - the study was conducted at Salem in the month of July 2010 which included 45 diabetic cases from a private hospital in Salem. The mean age of diabetic patients was 49.8 years. Subjects were enrolled based on a detailed questionnaire and an informed consent was obtained. Inclusion Criteria: Cases; age 40 - 50 years, diabetics under control. Exclusion Criteria: Alcoholics, diabetics with complications, subjects with auditory and visual disturbances. PC1000Hz Reaction timer was used to measure the auditory and visual reaction time.

Results: Pearson correlation analysis was done between visual reaction time, auditory reaction time and HbAIc among diabetics. Visual reaction time correlated positively with HbAIc (r value = 0.246). Auditory reaction time also correlated positively with HbA1c (r value = 0.486).

Conclusions: Auditory and visual reaction time is increased linearly with HbAIc values, indicating the extent of the neuropathic changes in diabetics whose blood sugar is under control. This can be routinely applied to monitor neuropathic changes in diabetics and its prognosis with treatment.

Keywords: Diabetic neuropathy; Visual reaction time; Auditory reaction time; Glycosylated hemoglobin.

PP-E-18

Intraocular Pressure (IOP) Changes in Postmenopausal Hypertensive Women – Need for Screening?

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Background: Ocular hypertension is "IOP > 21 mmHg in at least one eye, having normal visual fields and normal optic nerve head". It may progress to glaucoma if left undiagnosed. The mean IOP in postmenopausal women is higher than in the premenopausal women and is positively correlated with blood pressure (BP). There are no Indian studies on this as per literature review. We proposed to evaluate the IOP changes in postmenopausal hypertensive Indian women.

Objective: To evaluate the effects of increased BP and duration of menopause as a risk factor to ocular hypertension in postmenopausal women.

Design: This is a clinical comparative case-control study done in postmenopausal women (45 - 55 yrs) with 40 hypertensives (case) and 40 normotensives (control). IOP was recorded by Schiotz indentation tonometer and BP by Sphygmomanometer.

Results: 1. The mean IOP in normotensive postmenopausal women was 16.16±2.19 mmHg and in the hypertensive subgroup it was 18.63±2.88 mmHg (Student t-test, p=0.001). 2. Among the 80 postmenopausal women, 17 had an IOP > 21 mmHg (ocular hypertension) of which 16 belonged to the hypertensive and one to the normotensive group (z test, p <0.05). Of the 16 ocular hypertensives, 7 had a history of duration of menopause greater than 4 yrs, but it was not statistically significant.

Conclusions: This study shows that postmenopausal hypertensive women are at a higher risk of developing ocular hypertension, thus, signifying the need for regular screenings for an elevated IOP.

Keywords: Ocular hypertension; IOP; Menopause; BP.

PP-E-19

Implications of *Klotho* Gene To Insulin Resistance Syndrome and Other Age-related Disorders: A Meta-analysis

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Background: A very fundamental paradox of insulin resistance is that in a wide variety of animal models, impairment of insulin signalling increases life span but

in humans, insulin resistance increases the risk of a range of fatal disorders. On this background, the recent work on *Klotho* gene has raised certain novel possibilities. The *Klotho* gene over-expression increases longevity in mammals and it was claimed to do so by inducing insulin resistance. The *Klotho* protein appears to have a number of different actions in the body and a good critical review and meta-analysis is still lacking.

Objective: To compile, analyze and re-interpret the published literature on the actions of *Klotho* protein in mammalian models and to evaluate its implications for metabolic syndrome and other age-related disorders.

Methods: We searched literature over the last ten years about the various actions and effects of *Klotho* protein in mammalian systems and analyzed the data to make a predictive conceptual model of the net action of *Klotho* protein in the context of insulin resistance syndrome.

Results: The *Klotho* protein has a diversity of actions with some apparent contradictions. It has a pro-insulin resistance effect although the mechanism is debated. Paradoxically, it has a simultaneous anti-inflammatory, antioxidant and pro-angiogenesis actions.

Conclusions: The *Klotho* protein has demonstrated that insulin resistance can be decoupled from the associated pathophysiological mechanisms of systemic inflammation, oxidative stress and angiogenesis dysfunction.

Keywords: *Klotho* gene; Insulin resistance syndrome.

PP-E-20

Glycosylated Hemoglobin (HbA1c) in Type II Diabetes With and Without Complications

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Background: Diabetes mellitus is a prevalent disease with devastating consequences when vascular complications are present. In diabetes mellitus, the proportion of hemoglobin that is glycosylated is increased substantially.

Objective: The present study was carried out with an objective to compare and correlate glycosylated hemoglobin and blood glucose (fasting & post meal) levels in patients having diabetes with and without complications.

Design: In this study, 30 diabetic patients without any complications and 40 diabetic patients with microangiopathies were compared with 30 normal subjects of the same age group acting as a control group. Blood glucose and glycosylated hemoglobin levels were estimated in these three groups. Unpaired t-test and Pearson's correlation coefficient were used for the statistical analysis.

Results: In diabetics with microangiopathies, the fasting blood glucose level was 232.92±20.03, post meal blood glucose level was 267.96±25.68 and HbA1c % was 10.48±1.22. In diabetics without any complications, the fasting, the post-meal blood glucose levels and the HbA1c% were 163.07±20.31, 208.33±18.50 and 7.62±0.69 respectively. In non-diabetic control subjects, the fasting, the post-meal blood glucose levels and the HbA1c% were 95.12±9.31, 140.15±9.43 and 4.99±0.98 respectively.

Conclusions: It was observed that glycosylated hemoglobin percentage was more in diabetics and much more in diabetics with complications as compared to the non-diabetic controls; and this increase in glycosylated hemoglobin percentage showed a positive correlation with fasting and post-meal blood glucose levels.

Keywords: Glycosylated hemoglobin; Type II Diabetes Mellitus; Diabetic retinopathy; Diabetic nephropathy.

PP-E-21

Effects of Physical Exercise and Hormone Replacement Therapy on Lipid Profile Status in the Postmenopausal Women

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Background: Elevated lipid levels in the postmenopausal women are an important issue. Physical exercise and hormonal therapy are important factors which affect dyslipidemia among postmenopausal women.

Objectives: To observe the effects of physical exercise and hormone replacement therapy (HRT) on serum lipid profile in the postmenopausal women.

Methods: This study was done from 1st January to 31st December, 2009. Ninety (90) postmenopausal women, aged between 50 - 60 years and 30 premenopausal healthy subjects, aged between 20 - 30 years were included in the study. Among the postmenopausal women, 30 were performing regular physical exercise, 30 were receiving HRT and the remaining 30 were sedentary postmenopausal women without HRT. Lipid profile; TC, HDL-C, LDL-C, TG of all the participants were estimated.

Results: The mean serum TC, LDL-C and TG were significantly ($p < 0.001$) higher and the mean HDL-C was significantly ($p < 0.001$) lower in the sedentary postmenopausal women without HRT than those of the premenopausal women, the postmenopausal women with regular physical exercise and the postmenopausal women with HRT. The mean TC, LDL-C and TG were lower and the mean HDL-C was higher in the postmenopausal women with regular physical exercise than those of the postmenopausal women with HRT, but was statistically non-significant. The postmenopausal symptoms were comparatively lower in the postmenopausal women with exercise than those of the postmenopausal women with HRT.

Conclusions: Regular physical exercise may be more effective than HRT in improving lipid profile status in the postmenopausal women.

Keywords: Postmenopausal women, Lipid profile, Physical exercise, Hormone replacement therapy (HRT).

PP-E-22

Study of Lipid Profiles in Shift Workers

Md Abedur Rahman

Background: The present study was undertaken to compare the serum lipid profiles in apparently healthy shift workers and non shift workers and to identify the possible high risk factors for developing atherosclerotic changes.

Methods: The serum total cholesterol, triglyceride, HDL cholesterol and LDL cholesterol levels were estimated and the blood pressure was measured in apparently healthy adult shift worker and non shift worker participants. Sixty subjects from the age group of 20-50 years were selected; 30 were shift workers (study) for at least one year and 30 were non shift workers (control). Height, weight and the resting blood pressure of all the subjects were recorded before the collection of fasting blood samples for the estimation of serum lipid and lipoprotein levels. Data were analyzed by unpaired t-test.

Results: The mean serum total cholesterol and LDL cholesterol levels were significantly higher in the shift workers compared to those of the non-shift workers. The mean serum triglyceride and HDL cholesterol levels in the shift workers did not differ significantly from that of the non-shift workers. These changes may be related to the disruption of the circadian rhythm.

Conclusions: The changes in the serum lipid and lipoprotein levels, with the exception of HDL cholesterol and triglyceride, in the subjects engaged in shift work may put them at an increased risk for coronary artery disease.

Keywords: Circadian Rhythm; Lipid profile; Shift work.

PP-E-23

Exposure to Low Doses of Diazinon Induces Teratospermia and Oligozoospermia in Wistar Rats

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Background: Diazinon, an organophosphate insecticide commonly used in crop protection affects fertility. Semen quality and count is decreasing significantly among normal healthy population. This is an alarming sign. Hence, it is necessary to control the usage of pesticides as they impose a threat to the fertility.

Objective: The reproductive toxic effects of diazinon are scanty in the literature. Hence, the present study was aimed to evaluate the toxic effects of diazinon on spermatogenesis.

Design: Male Wistar rats (200-230gm) were segregated into 7 groups of n = 6; one control and six treatment groups with 6 mg, 7.5mg and 10mg/kg body weight (i.p) for acute (5 days) and chronic (30 days) durations. The diazinon groups were treated (i.p) in a gap of 24 hours. At the end of the treatment duration, the rats were killed and laparotomy was performed. The testis and the epididymis were separated. The epididymis was minced in phosphate buffered saline and 1% eosin Y and the sperm count was done as per the standard procedure. Smears were analyzed for sperm morphology. One-way ANOVA (Bonferroni test) was used to analyze the data.

Results: Diazinon resulted in a decline in the sperm count, ($p < 0.05$; $p < 0.01$, $p < 0.001$). It also induced sperm abnormalities; macrocephaly, microcephaly, tubular head, globular head, cephalocaudal defects, triple head, wavy tail, triple tails. Few unique defects; thick body sperm, microsperms, swollen body with blebs were noticed with a dose dependent increase in teratospermia.

Conclusions: Low doses of diazinon results in oligozoospermia and teratospermia in a dose dependent manner.

Keywords: Diazinon; Sperm count; Teratospermia.

PP-E-24

Comparison of VO_2max and Reaction Time in Premenstrual and Postmenstrual Phase

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Background: Cardiorespiratory efficiency and cognitive function tends to get affected by various sex hormones during phases of menstrual cycle.

Objective: 1. To study and compare cardiorespiratory efficiency by estimating VO2 max in premenstrual phase and postmenstrual phase. 2. To study and compare cognitive function with the help of reaction time in premenstrual phase and postmenstrual phase.

Design: It was a cross-sectional study. The study was conducted in 100 female medical students in the age group of 17 - 22 with regular menstrual cycle. Their cardiorespiratory efficiency was measured by Queen's

College Step Test during premenstrual phase (20th to 25th day of the cycle) and postmenstrual phase (5th to 10th day of the cycle). The cognitive function in the form of sensory motor coordination was estimated by auditory reaction time (VRT) and visual reaction time (ART) in the premenstrual phase and the postmenstrual phase. Results were analyzed statistically by using paired t-test.

Results: A statistically significant increase was observed in the auditory reaction time and the visual reaction time during the premenstrual period. VO2 max was significantly increased in the postmenstrual period.

Conclusions: It was found that the cardiorespiratory performance and the cognitive function were better during the postmenstrual phase.

Keywords: VO2 max; VRT; ART.

PP-E-25

Study of the Fasting Blood Glucose in Obese & Pre-obese Women in the Age Group of 45 - 49 Yrs

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Background: The association between Type 2 diabetes mellitus and obesity is so close that many experts consider them to be different ends of the same spectrum. Therefore, together they are called as 'diabesity'. Impaired fasting glucose (IFG) reflects an intermediate condition between normality and diabetes. Prevalence of IFG also seems to be higher in women than men in the Indian population. The present work is planned to study the pre-diabetic status in pre-obese and obese women with the help of the estimation of fasting blood glucose (FBG) levels.

Objective: To study the correlation if any between fasting blood glucose levels & body mass index (BMI) status in all groups.

Design: In 300 asymptomatic middle aged women with no family history of Type 2 diabetes mellitus.(D.M.), BMI was calculated . The study was done in 2 groups. The control group consists of 100 middle aged women with normal BMI, i.e, 18 - 24.99 (Group I). The study group consists of 2 subgroups, i.e, pre-obese with a BMI of 25 - 29.99 (Group IIa) & Obese group with a BMI >30 (Group IIb). Fasting blood glucose levels were estimated in all the groups. The results were analyzed statistically by using the correlation coefficient and the z test.

Results: The mean FBG levels in the pre-obese and obese group were found to be higher than the control group. In the entire subject population (n = 300), a statistically significant linear correlation was documented between BMI & FBG levels.

Conclusions: In a nutshell, BMI may be a good risk predictor for Type 2 D.M. especially in the middle aged women.

Keywords: Fasting blood glucose; Body mass index.

PP-E-26

Effect of Walking on Blood Sugar in Diabetics Compared to Normal

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Background: Life-style modification of the diabetic

patients is much recommended of which physical exercise is a corner stone in the management of diabetes mellitus.

Objective: To provide an overview of benefits of walking in NIDDM and normal individuals.

Design: The dissertation committee of institute approved the design and study protocol. The subjects were informed about the test protocol and consent was taken. Age in years, height in cm, weight in kg, radial pulse rate and the blood pressure measured before and after walking, were recorded and tabulated. In all the subjects, the FBS level is calculated at rest and 30 minutes of walking immediately. The study was conducted on 4 groups of male subjects (sedentary normal, walking normal, NIDDM sedentary, NIDDM walking) with various walks of life in relation to physical activities in the age range of 35 - 45 yrs.

Results: There is a significant decrease in the FBS in diabetics when compared to normal subjects after 30 minutes of walking, with the p value <0.001.

Conclusions: Physical exercise is considered beneficial in the treatment of diabetes mellitus. Attainment of ideal body weight, improvement in self image, a decrease in hypertension and lipid-related cardiovascular risk factors can all be achieved by diabetic individuals with regular exercise. The present study highlights these benefits and recommends 30 minutes of walking everyday to remain healthy.

Keywords: Diabetes, Life-style modification, Walking, Exercise.

PP-E-27
Body Weight Variations During Normal Menstrual Cycle

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Background: A minority of women manifest variations in their body weight during normal menstrual cycle, which could be due to the ovarian hormonal influences on body water during different phases of the cycle.

Objective: To study variations in body weight during Menstrual (I), Follicular (II), Ovulatory (III), Luteal (IV) and Premenstrual (V) phases of normal menstrual cycle.

Design: A cross-sectional study was conducted on 200 eumenorrhoeic, ovulatory, normotensive female medical students of mean age ± S.D. of 19.79±3.04 years of GMC, Patiala. The body weight was recorded at five different time points along one menstrual cycle, with the subject standing on a portable balance scale.

Results: Analysis of results revealed that variations in mean body weight throughout the menstrual cycle was not statistically significant ($p > 0.05$), although a small body weight was observed premenstrually.

Conclusions: These findings provide a pattern of menstrual cycle related physiological and clinicopathological conditions like cyclic oedema and premenstrual syndrome that could be related to the established actions of ovarian steroids.

Keywords: Menstrual cycle; Body weight.

PP-E-28

Bone Strength and Its Determinants in Peri and Postmenopausal Groups of Pakistani Women

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Background: Diminished bone strength increases the frequency of osteoporosis and fragility fractures. Weight and gonadal status are important determinants of bone mass in women.

Objective: The present study tried to find out the bone strength and its determinants in peri and postmenopausal age groups of Pakistani women.

Design: This is a cross-sectional study. Ninety females in the age range of 40 - 66 years were included in the study. According to their age and menstrual status they were divided into two groups: perimenopausal (50) and postmenopausal (40). BMI (body mass index) and bone related blood parameters were estimated. Bone mineral density was taken by peripheral densitometer.

Results: An early menopause, low levels of estrogen, increased BMI and low BMD are important predictors of increased fracture risk in Pakistani women.

Conclusions: Compromised bone strength increases the risk of fragility fractures. Physical activity and normal BMI can benefit women of all ages.

Keywords: Osteoporosis; Bone strength; Fragility fractures.

FC-F-01

Effect of Nigella Sativa Seeds Extract on the Reproductive Parameters in Male Rats

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Background: Nigella sativa has been traditionally used in many parts of the world for the treatment of a wide range of diseases.

Objective: Many studies have explored the pharmacological action(s) of Nigella sativa seed extract (NSE) or its active compound(s) on various body systems in vivo or in vitro. There is little information available on its role, if any, on the reproductive system.

Design: In this study, we investigated the effect of NSE on the reproductive parameters in male rats. Ninety days old Sprague Dawley rats (average weight 150±25gm) were randomly allocated to the control and the treatment groups and were maintained under standard conditions of 14 hour light and 10 hr dark cycle at 230C. The animals had free access to food and water. Treatment groups received daily NSE 50/ 75 mg/kg BW saline orally for 50 days. The control rats received the same volume of saline. At the end of the treatment, primary and accessory reproductive organs were dissected out and weighed. Blood, testes and testicular interstitial fluid were collected for hormonal measurement and histology. Testosterone was measured by radioimmunoassay.

Results: Body, testes weights and epididymal sperm reserve were significantly ($p < 0.05$) decreased with NSE treatment. Serum and interstitial fluid testosterone levels were also significantly reduced. These negative effects were reversed with the discontinuation of the treatment. Histological evidence also supports the hormonal data showing that treatment with NSE affects the tubular architecture.

Conclusions: These findings set a basis for future studies to explore the potential use of NSE in males as a contraceptive.

Keywords: Nigella sativa; Rat; Testes; Reproduction.

FC-F-02

A Comparative Study on Nutritional Status and Onset of Menopause Among Socio-economically Poor Rural Women of Birbhum District of West Bengal

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Background: Among the industrial workers in India, women have gradually proved to be a significant population and this is evident in industries like brick-kiln industry and china-clay industry. The women engaged in these two industries are not only lowly paid, but exposed to both environmental and physical stress. As a result, apart from being victims of different occupational health hazards, they are often denied proper nutrition and this may give rise to disturbances in their reproductive life span. Menopause or cessation of female reproductive cycle, though depends on several factors, nutrition also has an important bearing in this context.

Objective: The objective of this study is to assess the nutritional status and onset of menopausal age of women workers engaged in industries.

Design: Methods adopted: Nutritional anthropometry (BMI) as well as information of menopausal age through direct interaction with the subject Subjects: Adult rural women (no: 405) of S.C and S. T community of Birbhum district, attached to the industrial work.

Results: Thirty eight percent of brick-kiln workers and 51.7% of china-clay workers were found to be victims of Chronic Energy Deficiency (CED). The mean menopausal age for brick-kiln group is significantly higher than those for the china-clay group.

Conclusions: A significant difference in both nutritional status and mean menopausal age for the workers engaged in two different industries demands further investigations to address the problem.

Keywords: BMI; Menopause; China clay; Brick kiln

FC-F-03

Studies of Antigonadal Activity of Kesardam (Jussiaea Repens) in Male Albino Rats

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Background: Jussiaea repens L, which is locally known as Kesardam, is a creeping water primrose of the Onagraceae family. The whole plant is used in the therapeutic treatment for antibacterial and diuretic purposes, and in hematuria-, oliguria- or disurea-related diseases in different countries.

Objective: In Papua New Guinea, the leaves and stem of this plant are considered to have contraceptive properties (prevention of pregnancy), but no data is available till date regarding male contraception by Jussiaea repens.

Design: The crude extract of Jussiaea repens at the dose of 25 mg/100gm body weight/day in white albino rats was given for 40 days consecutively.

Results: Insignificant changes in body growth rate were seen when compared to the vehicle treated control. The weight of the testis was insignificantly reduced in the treated group, but the weight of the seminal vesicle and ventral prostrate were significantly reduced in the treated group. A few relevant changes have been found in the testicular tissues of the treated groups, namely, significant elevation in testicular cholesterol and

significant reduction in testicular ascorbic acid. The testicular LDH and HSD activities have also been reduced as compared to that of the vehicle treated control group. The fructose content in the seminal vesicle of the treated group has been reduced significantly where as the prostatatic change was found to be insignificant. The total sperm count from the caudal epididymis in the treated group was reduced at the highest level of significance.

Keywords: Jussiaea repens; Antigonadal; Male rat.

FC-F-04

Amelioration of Arsenic-induced Male Reproductive Malfunctions by Strategic Modulations of Dietary Proteins in Rats

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Background: Arsenic is a well known human carcinogen and it has many other toxic effects.

Objective: The effect of arsenic on testicular tissue and it's amelioration by dietary modulation were studied.

Design: Arsenic was given orally to rats of Wistar strain (b.w. 130±10 g) as arsenic trioxide (3 mg / kg b.w. / day) in a single dose for 30 consecutive days. A significant decrease ($p < 0.01$) in the relative testicular weight was observed in comparison to control, irrespective of body weight. This treatment caused an increase in the seminiferous tubular luminal space coupled with reduced accumulation of spermatozoa and disarray in cellular organization in the seminiferous tubule. A significant decrease ($p < 0.001$) in sperm count and motility and an increased level of testicular conjugated dienes ($p < 0.01$) were observed. The testicular superoxide dismutase activity and reduced glutathione level were decreased significantly ($p < 0.01$). The testicular 5-3ß-hydroxysteroid dehydrogenase and 17ß-hydroxysteroid dehydrogenase activities were also significantly decreased ($p < 0.01$ and $p < 0.02$ respectively).

Results: A high-protein (27% contributed by pea and 9% excess casein) diet supplementation along with the same arsenic exposure caused significant restoration in all respects. The relative testicular weight was increased toward normal. All these sperm physiological changes and altered gonadal features, both histomorphometric and histological, were found to be significantly ameliorated.

Conclusions: Thus, the present study shows that a chronic arsenic exposure exhibits reduced testicular gametogenic and androgenic functions by imposing oxidative stress, which can be reversed by high dietary protein co-administration.

Keywords: Arsenic; Testis; Toxicity; Dietary Modulation.

FC-F-05

Iron, Zinc and Endometriosis: A Preliminary Study

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Background: Deficiency of zinc is known to contribute to iron deficiency since both metals are absorbed from the gastrointestinal tract by the co-transporter divalent metal transporter 1 (DMT1).

Objective: To determine the association between blood levels of iron and zinc in endometriosis.

Design: Women with endometriosis (n = 25) confirmed by either laparoscopy or laparotomy were compared

with age-matched controls (n = 32) who had no evidence of endometriosis at laparoscopy or laparotomy. Whole blood samples collected from all participants were digested with supra-pure 65% HNO_3 and analyzed for metals using Total Reflection X-ray Fluorescence. Means of the log transformed metal levels were compared using t-tests. The correlation between iron and zinc levels was tested using Spearman correlation test.

Results: The mean (±SD) blood levels of iron in the cases (660.65±86.81 µg/L) were significantly lower than in the controls (1019.14±172.92 µg/L, p = 0.026). The mean (±SD) zinc levels in the cases (111.51±74.22 µg/L) were lower than in controls (182.21±73.8 µg/L), although this difference was not statistically significant (p = 0.828). Zn levels in the controls were lower than reference norms (330 - 750 µg/L).

A significant positive correlation was noted between iron levels and zinc levels in patients with endometriosis (Spearman r = 0.579; p = 0.002) which was absent when the correlation was performed in controls alone (Spearman r = 0.132; p = 0.47) or when both cases and controls were considered together (Spearman r = 0.207; p = 0.123).

Conclusions: This group of patients with endometriosis had lower blood levels of iron and zinc as compared to the controls, although the difference in the latter was not statistically significant. In this group of patients with endometriosis, zinc deficiency was associated with low blood iron levels.

Keywords: Iron; Zinc; Endometriosis.

FC-F-06

Endocrine Correlates of Polycystic Ovary Syndrome (PCOS) In Pakistani Women

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Background: The polycystic ovary syndrome (PCOS) is a heterogeneous and a multifactorial disorder. The phenotype of PCOS is variable and modified by a number of factors including environmental and ethnic background. Preliminary surveys have indicated considerable incidence of PCOS in Pakistani population.

Objective: The current study, therefore, was planned to systematically examine specific endocrinal changes and interaction amongst hormones in local cohorts of PCOS patients. As a corollary objective, endocrine parameters were also estimated in (apparently non-suffering), first degree relatives (FDR) of PCOS patients.

Design: This prospective, cross-sectional study comprised of three groups, i.e., controls (n = 50), PCOS patients (n = 65), and FDR of patients (n = 25), aged between 18 - 45 years. The PCOS patients were examined in the Infertility Clinic of Lady Wallingdon Hospital, Lahore. After the clinical examination a detailed menstrual and family history was recorded through a questionnaire; followed by an ovarian ultrasound examination. The blood samples were drawn for hormonal analysis and analysed by radioimmunoassay at the Centre of Nuclear Medicine (CENUM), Mayo Hospital, Lahore.

Results: The mean values of BMI (26.23±0.55; p <0.001), LH (38.11±3.11; p <0.001); FSH (3.74±0.25; p <0.001), LH:FSH ratio (21.53±5.83; p <0.01), insulin, (43.48±4.09; p <0.001), testosterone (1.19±0.0; p <0.001), androstenedione (2.11±0.09, p <0.001) and prolactin (9.75±0.71; p <0.001) were found to be significantly raised as compared to the control subjects. The GH values (3.46±0.83; p <0.414) were not changed. The LH and testosterone correlation was found to be non-significant (r = 0.068, p=0.05), while LH and androstenedione was highly significantly correlated (r = 0.375, p <0.01) in PCOS patients. The hormonal concentrations in FDR subjects were less (p=0.005 - 0.01) as compared to the PCOS patients but were comparable to the control values.

Conclusions: The data demonstrated highly raised gonadotrophins and androgens in PCOS. The study suggests that measurements of gonadotrophins and LH to FSH ratio are dependable diagnostic hormonal

parameters. It appears that LH is the most important reproductive hormone in PCOS leading to hyperandrogenism. These hormonal changes are interlinked and an attribute of ethnic, cultural and environmental factors in the local Pakistani women.

Keywords: Polycystic ovary syndrome; Endocrine parameters.

PP-F-07
Inter-relationship Between Waist Circumference, Hip Circumference, Sperm Count and Total Sperm Motility

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Background: Obesity is rapidly increasing worldwide including developing countries like India. Many studies indicate a definite effect of obesity on female fertility but there are only a few studies on the effect of obesity on male fertility potential.

Objective: This study was done to evaluate whether there exists any relation between waist circumference, hip circumference and semen parameters (sperm count and total motile sperms).

Design: This study included 300 normal, healthy male volunteers between the age group of 20 and 35 years. Their waist circumference (WC) was measured using a measuring tape halfway between the iliac crest and the bottom of the 12th costal bone at the end of a normal expiration in a fasting state. The hip circumference (HC) was measured using the same tape at the level of the tuberculi majoris. Semen sample was produced by the volunteers by masturbation and semen analysis was done as per the WHO guidelines. The correlation between WC, HC, and semen parameters (which included sperm count and total sperm motility) was then studied.

Results: Both WC and HC were negatively correlated with the sperm count ($r = -0.631$, $p < 0.0001$ and $r = -0.561$, $p < 0.0001$ respectively) and with the total sperm motility ($r = -0.616$, $p < 0.0001$ and $r = -0.544$, $p < 0.0001$ respectively).

Conclusions: We conclude that in overweight and obese males (indicated by WC and HC), sperm count and total motile sperms decrease. Overweight/obese individuals may be advised to improve their physical condition which may improve their semen quality.

Keywords: Waist circumference; Hip circumference; Sperm Count; Total Sperm Motility.

PP-F-08
Epididymal Secretory Proteins and Their Role in Sperm Maturation

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Epididymal secretory proteins are well known to play a role in sperm maturation. Newly emerging technology including microarray and proteomics techniques and libraries of expressed sequence tags, in combination with digital differential display tools and publicly available gene expression databases, are being currently used to identify and characterize novel epididymal proteins. The data reported so far on molecular and functional characterization of secretory epididymal proteins has provided very useful information regarding the identification of novel highly expressed genes in the human epididymis. Further, deleting the gene of interest by targeted ablation technology in mice or using immunization against the cognate protein are the two preferred methods to functionally validate the function of novel genes *in vivo*. This review describes the current status of several epididymal proteins shown

either *in vivo* or *in vitro* to be involved in the epididymal sperm maturation. For example, CRISP1, SPAG11e, DEFB126, carbonyl reductase P34H, CD52 and GPR64 are suggested to have an important role in regulating the sperm maturation process. Moreover, the possible molecular mechanism(s) involved in these phenomena will be discussed with relevance to their clinical importance in the development of new male contraceptives, one of the major areas of fertility regulation.

PP-F-09

Evaluation of Cardiovascular Response to Exercise In Different Phases of Menstrual Cycle

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Background: Menstrual cycle involves complex interactions of hormones affecting health and work performance.

Objective: To record and compare pre- and post-exercise cardiovascular parameters in different phases of the menstrual cycle. To compare duration of exercise and recovery time in the three phases.

Design: In this study, 30 healthy, female medical students in the age group of 17 to 19 years having a regular menstrual cycle were evaluated during each of the three phases (luteal, menstrual, proliferative) defined based on the last menstrual period. Weight, temperature, pulse, blood pressure, respiratory rate, duration of exercise and recovery time were recorded at baseline and after exercise using Master's step at 30 times/minute till exhaustion. Repeated measures analysis of variance was analyzed on SPSS version 15.

Results: Body weight was highest in the menstrual phase and least in the proliferative ($p < 0.5$). Baseline temperature was significantly elevated in the luteal phase. Baseline diastolic blood pressure was significantly lower and pulse pressure higher in the menstrual phase. Baseline respiratory rate was lowest in the menstrual phase. All cardiovascular parameters showed significant change post exercise. Quantum of rise in the systolic blood pressure and pulse pressure was lowest in the menstrual phase. Diastolic decreased significantly after exercise but no difference was noted between the three phases. Duration of exercise was longest in the luteal phase with the shortest recovery time ($p < 0.5$). Exercise performance was poorest in the menstrual phase.

Conclusions: Significant variations exist in the cardiovascular exercise response during menstrual cycle with the best performance in the luteal phase and the poorest during menses. This is likely mediated by female sex hormones affecting the response to exercise which may affect athletic capacity.

Keywords: Exercise response; Cardiovascular; Menstrual cycle; Recovery time.

PP-F-10

Impact of Estradiol on PGE_2 Production by Endometrial Stromal Cells of Buffalos

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Background: Prostaglandins are the mediators of various reproductive events including luteolysis, recognition and establishment of pregnancy in ruminants. PGE_2 produced mainly by the stromal cells plays an important role in vasodilatation, angiogenesis and decidualization at the time of establishment of pregnancy. The production and secretion of prostaglandins is regulated by the steroid hormones.

Objective: The aim of the study was to explore the effect of estradiol on PGE_2 production by the stromal cells *in vitro*.

Design: Endometrial tissues, after washing in PBS, were digested at 37°C for 1 hr in RPMI-1640 medium containing collagenase. Dissociated cells were then washed and cultured in RPMI-1640 medium. Sixteen hours after the primary culture, the contaminating epithelial cells were removed by treatment with 0.25% trypsin solution and the remaining cells were cultured in RPMI-1640 medium at 38.5°C in the presence of 5% CO_2 for 7 days. After reaching the confluency, endometrial stromal cells were treated with increasing doses of estradiol (2.5, 5, 10, 20 and 50 nM) for 24 hrs. At the end of the culture, the medium was collected for measurement of PGE_2 by ELISA.

Results: The production of PGE_2 increased linearly from 5 nM estradiol treatment to a maximum concentration with 50 nM estradiol. The concentrations of PGE_2 were 13.63±7.71 ng/ml in the control group which increased to a maximum of 19.279.91 ng/ml with 50 nM estradiol in the stromal cells.

Conclusions: The production and secretion of PGE_2 is modulated by estradiol in the stromal cells of buffalos.

Keywords: PGE_2; Estradiol; Endometrial stromal cells.

PP-F-11
Preterm Delivery: Role of Zinc and Copper

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Background: Preterm delivery is a challenging obstetric complication in Bangladesh. Reduced serum Zn and Cu concentration in the pregnant mother may have some role in causing preterm delivery.

Objective: To measure serum zinc and copper levels in mothers with preterm delivery and also to observe their relationship with the fetal outcome.

Design: This cross-sectional study was carried out in Dhaka during the period of 1st January, 2009 to 31st December, 2009. A total number of 136 subjects between 20 and 40 years were included in this study of whom 27 were full-term delivery mothers with their respective neonates (control) and another 27 were preterm delivery mothers with their respective neonates (study group). For the reference value, 28 non-pregnant women with an age range from 20 to 30 years were taken.

Results: The mean serum Zn and Cu levels were significantly lower ($p < 0.001$) in preterm mothers in comparison to those of full-term mothers. Again, cord serum Zn and Cu concentrations were significantly ($p < 0.001$) lower in preterm neonates when compared to those of full-term neonates.

Conclusions: The present study revealed a lower level of serum zinc and copper in preterm delivery mothers and their neonates. These hypozincemia and hypocupremia may be responsible for the poor fetal outcome.

Keywords: Zinc; Copper; Preterm.

PP-F-12
Effect of Age of Animals and Dose of Gonadotropins on the Quality of Normal and Manipulated Mice Embryos

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Background: Superovulation in mice is routinely done by sequential administration of pregnant mare serum gonadotropin (PMSG) and human chrorionic gonadotropin (hCG). However, the response differs.

Objective: The objective of the present study was to assess the superovulation response in terms of embryo quality in relation to the age of the mice and the dose of gonadotropins.

Design: Weaned female mice (strain ICR) aged 4-8, 8-12 and 12-16 weeks were given 5, 10 and 20 IU of PMSG intraperitoneally (i.p.) and 48 hrs later were given 5, 7.5 and 10 IU hCG i.p. and placed individually in cages with mature males (strain ICR). After ~16 hrs, the females were sacrificed to harvest presumptive zygotes. Animal usage was approved by the Institutional Animal Care and Use Committee. Presumptive zygotes were then placed in TCM-199 at 38.5°C. Cumulus cells were removed from the embryos in 2 mL TCM medium containing hyaluronidase (300 U/mL).

Results: Approximately, 10 to 15 normal and microinjected embryos were cultured (in a humidified 5% CO_2 atmosphere at 37 °C) in each 50 µL droplet of TCM-199 supplemented with standard additives, overlaid with light mineral oil. Embryos at various development stages were monitored up to the blastocyst hatching stage.

Conclusions: We observed that embryo quality was affected by both the age of the animal and the dose of gonadotropins. The highest response was observed with 5 IU of PMSG and hCG with 4-8 and 8-12 weeks' age group of mice.

Keywords: Gonadotropin; Mice; Embryo.

PP-F-13

Hematological and Electrocardiographic Variations During Menstrual Cycle

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Background: Menstruation coupled periodic bleeding from the blood vessels at the time of shedding of the uterine mucosa has directed interest especially in the hematological changes during different phases of the menstrual cycle.

Objective: The study was a moderate attempt to determine regular variation in the different hematological parameters and ECG during different phases of the menstrual cycle in normal healthy females and evaluate conflicting reports on the subjects.

Design: The present study was carried out on 30 healthy female medical students in the age group of 18 to 23 years with a normal menstrual cycle of 30±3 days. The various hematological parameters (TLC, TRBC, TPC, absolute eosinophil, BT, CT, and DLC) and electrocardiography were studied on the 2nd, 11th, 14th and 22nd day of the menstrual cycle.

Results: The study reveals that the total leukocyte count and the total platelet count significantly increased ($P < 0.001$) around mid-cycle; however, the total eosinophil count significantly decreased ($P < 0.05$) during the same period. The differential leukocyte count, bleeding time, clotting time, heart rate, P-R interval and Q-T interval did not show any significant change during the different phases of the menstrual cycle, although some mild changes were observed.

Conclusions: The changes observed in all those parameters during the menstrual cycle may be associated with the presumptive changes in blood estrogen and the possibility that they are influenced by blood gonadotropic hormone at the time of ovulation or by blood progesterone or body temperature during the latter half of the cycle.

Keywords: Menstrual cycle; Electrocardiography.

PP-F-14

Physiological Ocular Changes During Pregnancy

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Background: Various physiological changes occur in the body during pregnancy and the eye is no exception.

The temporary changes in vision will return to normal after delivery.

Objective: To identify the ocular changes during the first, second and third trimesters of pregnancy by doing an ocular examination along with the routine antenatal examination.

Design: This study comprised of 90 pregnant women in the age group of 20 to 30 years without any refractive error presently and previously. Control group - First trimester pregnant women (n = 30). Case group - Second trimester (n = 30) and Third trimester (n = 30) pregnant women. Along with the routine antenatal hematological laboratory investigations, ocular examination was performed by the following procedures. (1) Testing of Visual acuity: Distance Vision - Snellen's chart; Near Vision - Jaeger's chart; Color Vision - Ishihara's chart; Field of Vision - Lister's perimeter. (2) External Ocular Examination: Corneal Curvature - Keratometry; Anterior Chamber - Slit–lamp; Pupil - Light reflex; Intraocular Pressure - Schiotz tonometry. (3) Fundus Examination – Ophthalmoscope.

Results: The data was analyzed by the Student's t-test. There was a significant increase in the corneal curvature ($p < 0.01$) and a significant decrease in the IOP ($p < 0.01$) in both eyes during the second and third trimesters of pregnancy as compared to the first trimester.

Conclusions: The increase in corneal curvature is due to the development of corneal edema and the decrease in IOP is due to the increased facility of aqueous outflow under the influence of increasing progesterone and beta subunit of human chorionic gonadotropin levels and decreased episcleral venous pressure related to generalized reduction in peripheral vascular resistance.

Keywords: IOP; Schiotz tonometry; Corneal curvature; Keratometry.

PP-F-15

Modifiable Risk Factors Associated with Quality of Semen in Men Investigated for Infertility

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Background: Identifying self modifiable risk factors are important in preventing further reduction in semen quality. This study describes the association between modifiable risk factors and sperm parameters of men investigated for infertility

Method: A descriptive cross sectional study was conducted in the Faculty of Medicine Colombo in 2010. An interviewer administered questionnaire was used to identify the risk factors in 100 men after obtaining informed consent. The identified risk factors were smoking alcohol consumption mobile phone usage tight clothing and posture. Seminal fluid analysis was performed according to WHO guidelines and the means of sperm parameters were compared with each risk factor. Statistical significance was tested by student t test.

Results: Mean age (SD) was 35.7(0.13) years. Only 16% were normozoospermic. Motility abnormalities were the commonest (81%).Although there was no significant difference in sperm parameters between alcohol consumers and non consumers when the frequency of consumption increased the sperm count motility and viability decreased. A similar trend was seen when the number of cigarettes smoked was more than 10 per day. The progressive sperm motility was significantly lower in mobile phone users and viability decreased when the phone was carried close to genital area ($P<0.05$). Morphology and viability of sperm were reduced in men who wore tight clothing. Progressive motility was reduced in men who were in seated position for more than 6 hours per day.

Conclusion: The incidence of pathozoospermia is high compared to previous studies. Smoking, alcohol consumption use of mobile phones, tight clothing and seated posture seem to have detrimental effects on quality of semen.

FC-G-01

Environmental Enrichment Ameliorates Depression-induced Cognitive Deficits and Impaired Hippocampal Synaptic Plasticity

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Background: Depression is a serious mental illness and is known to affect the cognition. Several clinical studies have demonstrated depression-induced deleterious effects on the hippocampus, frontal cortex and amygdala leading to cognitive deficits. Even though depression causes learning and memory deficits, the neural basis at the cellular and electrophysiological levels are yet to be studied.

Objectives: To investigate the physiological and cellular mechanisms underlying depression-induced cognitive deficits and to understand the role of environmental modulation in the amelioration of depression-induced brain dysfunctions.

Design: Endogenous depression was induced in male Wistar rats by the administration of clomipramine from postnatal days 8 to 21. The induction of depressive behavior in adulthood was confirmed in the sucrose preference and forced swim tests.

Results: Depressive animals exhibited impaired spatial learning and memory in a partially baited radial arm maze task. Depression resulted in amygdalar hypertrophy and anxiety-like behavior in the elevated plus maze. Furthermore, hippocampal long-term potentiation (LTP) was severely impaired. The conventional antidepressant treatment is associated with moderate to severe side effects when used chronically. Hence, it is important to adopt non-conventional methods of treating depression with minimal or no side effects without relapse. Accordingly, we have chosen a non-invasive paradigm, enriched environment (EE), which is known to induce progressive plasticity. When the depressive animals were exposed to EE for 14 days, the EE restored spatial learning and memory deficits and hippocampal LTP, altered volumes of the amygdala and hippocampus and anxiety behavior.

Conclusions: Our results demonstrate the powerful role of enriched environment in ameliorating cognitive deficits and emphasize the importance of positively stimulating social and physical environments in the treatment of mood disorders.

Keywords: Endogenous depression; Learning and memory deficits; Enhanced anxiety; Long-term potentiation; Environmental enrichment.

FC-G-02

Amygdalar Inactivation Prevents Stress-induced Cognitive Deficits and Impaired Hippocampal Long-term Potentiation

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Background: Chronic stress leads to regressive plasticity in the hippocampal and prefrontal cortical neurons, which are associated with learning and memory impairment. In contrast, chronic stress leads to the hypertrophy of the basolateral amygdalar (BLA) neurons, which is responsible for enhanced anxiety. There are several lines of evidence which indicate that the BLA interacts with the hippocampus and prefrontal cortex in regulating deleterious effects of stress on learning and memory functions.

Objective: We studied the role of the basolateral amygdala neurons in mediating stress effects on the hippocampus and prefrontal cortex by inactivating BLA during stress and examined the effects of stress on

Schaffer collateral-CA1 long-term potentiation (LTP), working memory in T-maze and anxiety-like behavior in the elevated plus maze.

Design: Male Wistar rats were subjected to chronic immobilization stress for 10 days (2 h/day) and BLA was inactivated during stress using lidocaine (2 µl, 40 µg/site for 5 min). After the completion of experiments, the animals from different groups were subjected to electrophysiological and behavioral assessments.

Results: Our results showed that stressed animals exhibited impaired hippocampal LTP, which was restored by amygdalar inactivation. Further, chronically stressed rats showed impairment in working memory and increased anxiety-like behavior, while silencing of BLA neurons during stress blocked working memory impairment and anxiety behavior.

Conclusions: Our results indicate the importance of developing new strategies to modulate amygdalar activity and this may have clinical implications in treating stress and stress-related disorders including post-traumatic stress disorder and depression.

Keywords: Anxiety; Inactivation of amygdalar neurons; Chronic immobilization stress; Cognitive deficits; Long-term potentiation; Regressive plasticity; Working memory deficits.

FC-G-3

Celastrus Paniculatus Willd. Ameliorates Stress-induced Learning and Memory Deficits, Impaired Hippocampal Long-term Potentiation and Restores Acetylcholinesterase Activity

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Background: Stress is a condition that seriously perturbs physiological and psychological homeostasis resulting in disorders ranging from anxiety to post-traumatic stress disorder. Severe traumatic or repeated stress can result in long-term deleterious effects leading to depression and cognitive deficits. Traditional or folk medicines have been widely employed for centuries and they remain one of the important sources for the discovery of new bio-active compounds to treat affective disorders. One of these includes the plant *Celastrus paniculatus Willd.* known for centuries as "the elixir of life".

Objective: The aim of the present study was to evaluate the effect of *Celastrus paniculatus* treatment on stress-induced learning and memory deficits, impaired hippocampal long-term potentiation (LTP) and reduced acetylcholinesterase (AChE) activity in the different brain regions.

Design: Male Wistar rats were subjected to restraint stress for 21 days (6 h/day). Stressed rats were chronically treated with two doses of *Celastrus paniculatus* oil for 14 days (400 mg and 600 mg/kg b.w). After the treatment, rats were subjected to behavioral, biochemical and electrophysiological experiments.

Results: We observed that chronic restraint stress impaired learning and memory in partially baited radial arm maze, impaired LTP in the hippocampus and decreased AChE activity in the hippocampus, frontal cortex, septum, hypothalamus and brainstem. Interestingly, *Celastrus paniculatus* treatment ameliorated stress-induced cognitive deficits and impaired LTP and restored AChE activity.

Conclusions: Thus, our study indicates that *Celastrus paniculatus* is a potential natural drug for the treatment of stress and stress-associated cognitive deficits. This opens up the possibility of developing novel agents from nature to enhance synaptic plasticity as a means of treating a variety of psychiatric diseases including depression.

Keywords: Chronic stress; Learning and memory deficits; *Celastrus paniculatus Willd.*; Long-term potentiation; Affective disorders.

FC-G-04

Effects of Iron Supplementation on Cognitive Function in Iron Deficient Adolescent Females; Results From Sri Lanka

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Background: Iron is the commonest micronutrient deficiency in adolescence. The effects of iron deficiency on adolescent cognitive function have given inconclusive results.

Objective: To determine the iron status of adolescents and its impact on cognitive function in female adolescents before and after iron supplementation.

Design: A descriptive interventional study was conducted to determine the iron status of 528 female adolescents aged 11 to 14 yrs. In a subsample of 180 subjects [i.e. 60 iron deficient anemic (IDA), 60 iron deficient (ID) and 60 non anemic (NAN)], cognitive functions were assessed using Weschler Intelligence tests (WISC—IV) (Psychological Corporation, UK) and Tests of Nonverbal intelligence (TONI– 3) (Western Psychological Services, USA). The IDA and ID adolescents were iron supplemented for three months and reassessed.

Results: IDA was observed in 86 (16.3%) and ID in 134 (25.4%) subjects. Mean scores of Perceptual Reasoning Index (PRI), Working Memory Index (WMI), Verbal Comprehension Index (VCI), Processing Speed Index (PSI) and Full scale IQ (FSIQ) of IDA and ID adolescents were significantly decreased ($p < 0.05$). Iron indices and intelligence test scores were positively correlated ($p < 0.05$). An improvement in VCI (ID and IDA groups), PSI (IDA group) and TONI scores were observed after supplementation ($p < 0.05$).

Conclusions: Iron status is important for cognitive function among female adolescents. Iron supplementation may reverse the impairments in cognitive function due to iron deficiency. Brain iron depletion and its resultant effect on neurotransmitter function and delayed myelination of central conducting pathways may be the cause for these cognitive impairments.

Keywords: Iron deficiency; Cognitive function; Adolescent.

FC-G-05

Evaluation of Acoustic Shock-induced Hearing Loss with Audiometer and Distortion Product Otoacoustic Emissions

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Background: Acoustic shock injury has been described as an injury to the auditory system due to continuous high levels of sound from incoming signals sufficient to contribute to a daily noise dose in excess of 85 decibels or very loud impulse sound reputed to be in excess of 120 decibels. The loud impulse sounds are variously described as shrieks, spikes, howls, screeches, squawks and acoustic incidents.

Objective: To compare the results of audiogram and distortion product otoacoustic emissions (DPOAEs) parameters due to acoustic shock injury in call center professionals working in a noisy environment.

Design: Hearing functions of 340 subjects were assessed with pure tone audiometry and DPOAEs. The results were compared among two groups - 1) audiometrically normal ears of acoustic shock exposed subjects and 2) audiometrically abnormal ears of acoustic shock exposed subjects.

Results: DPOAEs parameters like sound noise ratio and response amplitude showed statistically significant

differences between groups 1 and 2 at all frequencies. Statistically significant differences in pass rate for DPOAES were also found between groups 1 and 2 at all frequencies.

Conclusions: DPOAEs are more sensitive than audiometry to detect pre-symptomatic inner ear damage. They may play a role as a screening and monitoring test for acoustic shock exposed workers.

Keywords: Acoustic shock injury; Otoacoustic emissions; Call center professional; Occupational health.

FC-G-06
Early School Start Timings Affect the Mood and Performance of Students

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Background: Early school start timings along with delayed sleep phase syndrome causes adolescents to lose sleep during the school week. Studies have attributed insufficient sleep as one of the factors contributing to poor school performance of the students.

Objective: To compare the academic performance, sleep routines and mood in students attending the same school but having two different shifts.

Design: A questionnaire-based cross-sectional study was conducted among 834 students from VI to X standards attending different shifts [shift I (7:00 am to 1:10 pm) & shift II (11:30 am to 6:00 pm)]. The questionnaires evaluated the student for sleep pattern, duration, quality and mood. Daytime sleepiness was scored using Epsworth Sleepiness Scale. Performance was calculated by their percentages in the respective subjects.

Results: Both groups were comparable in baseline characters having a mean age of 12.9±1.33 (shift I) & 12.9±1.21 (shift II). Shift II students had significantly greater total sleep time and only 19% of them were sleep deprived (total sleep time <8 hrs) compared to 58% of shift I. Shift II students had better overall performance, performing significantly better in English ($p = 0.001$) and Mathematics ($p = 0.003$). Sleepiness, anxiety and depression were more in shift I students.

Conclusions: The study shows that students of the morning shift are more sleep deprived during the school week and register greater sleepiness which may be a cause for their lower academic performance. If schools start late, students will get more sleep, thereby reducing sleep debt and increasing their ability to be effective learners.

Keywords: Sleep deprivation; DSPS performance.

FC-G-07
Differential Superoxide and Peroxide Handling Capacities of Brain Regions: Implication in Neurodegenerative Disorders

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Background: The brain is an easy target for oxidant imbalance. The contribution of free radicals in various pathophysiological processes is very important, while they could be generated in the normal course of oxidative metabolisms. Most of the neurodegenerative diseases are associated with oxidative stress. Differential responses of brain regions to aluminum-induced neurodegeneration are well documented.

Objective: The present study is aimed to find regional differences in the oxidative stress handling capacity of

the brain. Susceptibility of the oxidant handling capacities of different brain regions to aluminum intoxication is also studied.

Design: In the present study, rats were exposed to different doses of prooxidant (ethanol) and the superoxide and peroxide handling capacities of the cerebrum, thalamic area, midbrain regions and cerebellum had been explored in the presence and the absence of aluminum exposures.

Results: Both glutathione-dependent and glutathione-independent superoxide handling capacities of different brain regions were found to be altered by aluminum exposure along with their respective peroxide handling capacities. However, the extent of alteration varied depending on the doses of prooxidant exposure. To some extent, regional differences in this regard have also been observed.

Conclusions: Aluminum, though is not an oxidant per se, can alter the oxidant status of brain regions by altering their oxidant handling capacities. Even though the oxidative stress is not the direct impact of neurotoxicant, they might be instrumental to produce an oxidant imbalance in the neuronal microenvironment so that the neurodegenerative changes could be initiated or hastened.

Keywords: Brain regions; Oxidative stress; Aluminum; Ethanol.

FC-G-08

Antinociceptive and Anti-inflammatory Activities of Essential Oil of *Nepeta Crispa Willd.* In Experimental Rat Models

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Background: *Nepeta crispa Willd.,* a plant of Lamiaceae family, is one of the most aromatic plants of Southeast Asia, especially in Iran. Beverages and infusion prepared from its aerial parts were traditionally used as a sedative, relaxant, carminative and restorative tonic for nervous and respiratory disorders.

Objective: This study was aimed to evaluate the antinociceptive and anti-inflammatory effects of the essential oil from the aerial part of this plant.

Design: For antinociception, tail-flick test (somatosensory pain) and formalin test (chemical pain) pain models and for anti-inflammation, formalin-induced paw edema test was done on 27 male Wistar rats weighing about 225±25 gm. Animals were treated intraperitoneally with normal saline for the control group (6 to 9 rats) and the essential oil at 30, 100 and 200 mg/kg for the three experimental groups (18 rats) respectively.

Results: The oil dose dependently produced significant antinociception in both the pain models and potent anti-inflammation in the paw edema model. Its effect on both acute and chronic pain seems to be via the central and peripheral mechanisms of action.

Conclusions: In conclusion, it may be suggested that the essential oil of *Nepeta crispa* may lessen both the early and late phases of nociception and may have an effective role against inflammation but the dose should be maintained precisely to obtain the intended effect. Also, the exactly responsible component for these effects and their mechanism of action cannot be elucidated from this study. Further study is needed to explore the exact effect of this essential oil on antinociception and anti-inflammation.

Keywords: *Nepeta crispa Willd.;* Antinociception; Anti-inflammation.

FC-G-09

A Cross-sectional Study to Assess Hearing Impairment in School Going Children Aged 6 to 10 Years of Belgaum

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Background: Hearing loss of any type or degree if occurs in infancy or childhood can interfere with the development of a child's spoken language, academic performance, reading and writing skills.

Objective: The objective of the present study was to determine the prevalence of hearing impairment among school going children aged 6 to10 years of Belgaum city and to identify the etiological factors of diminished hearing and their distribution patterns.

Design: The present cross-sectional study was carried out among 810 school going children of 6 to 10 years age group in Belgaum city. Otoscopic examination and tuning fork tests were used as screening tools and pure tone audiometry was the confirmatory test.

Results: The overall prevalence of hearing impairment was found to be 9.25%. Conductive hearing loss was predominant (97.33 %) with mild degree hearing loss being the most prevalent (84%). Chronic suppurative otitis media (CSOM) was the most common cause (60%) followed by otitis media with effusion (OME) (18.66%).

Conclusions: Most of the etiological factors causing hearing impairment in children are treatable. Screening tests at school entry levels and ear healthcare education in community can minimize the prevalence of ear pathologies and hence hearing impairment.

Keywords: Hearing impairment; Prevalence; School going children; Audiometry.

PP-G-10

Evaluation of Nerve Conduction Velocity in Obese Individuals

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Background: Subjects with obesity have an increased risk for developing both nerve conduction slowing and small sensory fiber neuropathy.

Objective: This study was performed to determine whether there is a difference in the nerve conduction velocity based on body fat (BMI).

Design: A total of 50 obese individuals in the age group of 30 to 45 years with a body mass index between 30 and 35 are selected for the study. Individuals with hypertension, pre-existing neuropathy, vitamin deficiency, history of smoking and alcoholism, any drug intake and diabetes are excluded from the study. Obese subjects are selected from the Department of Endocrinology, Government Hospital and Madras Medical College. Age and sex matched healthy individuals are used as controls. The study is conducted in the Institute of Physiology and Experimental Medicine, Madras Medical College. Nerve conduction velocity is recorded with Recorders & Medicare Systems – Electromyogram and the subject is asked to avoid any stimulants (caffeine) for 4 hours prior to the procedure. The study is conducted at ambient room temperature to eliminate the effect of temperature on nerve conduction velocity. The median nerve motor and sensory nerve conduction velocity and the tibial nerve motor nerve conduction velocity is measured.

Results: The mean value of sensory nerve conduction velocity in obese individuals is 38.47 m/s as compared to 47.56 m/s in healthy controls and the mean motor conduction velocity of the median and tibial nerves of obese individuals is 42.34 m/s and 41.26 m/s respectively. The motor nerve conduction velocity in the median nerve and the tibial nerve of healthy controls is 48.83 m/s and 47.19 m/s respectively. The sensory

conduction velocity is more affected than the motor conduction velocity.

Conclusions: Neuropathy is an emerging problem in obesity caused by oxidative stress and other causes. Nerve conduction studies and reduction of body mass index with dietary measures and exercise will prove to be a significant tool in the progression of neuropathy in obesity.

Keywords: Nerve conduction velocity; Body fat; Body mass index; Obesity.

PP-G-11

An Experimental Study to Evaluate the Effect of Instrumental Indian Classical And Western Music Therapy on Learning And Memory In Stress-induced Young Rats

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Background: Stress is known to induce alterations in various physiological responses even leading to a pathological state. Stress is known to be linked with memory. A long-term stress leads to cognitive deficits. One of the most powerful sources of auditory stimulation in the human brain is provided by music. Listening to music is a complex process for the brain since it triggers a sequel of cognitive and emotional components with distinct neural substrates.

Objective: To compare the effect of classical instrumental Indian music and Western music on learning and memory of stress-induced young rats.

Design: The rats of age 30 days are stressed by Tube stress for a duration of 1 hour per day for 10 days followed by instrumental music therapy. Four Comparative groups with 6 rats in each group are studied - (1) Normal control; (2) Stress control; (3) Stressed and then treated with instrumental Indian music therapy; (4) Stressed and then treated with instrumental Western music therapy. Then, the rats were tested for cognitive and behavioral changes in the elevated plus maze and Morris water maze along with age-matched control rats.

Results: Stress significantly increases the anxiety and also decreases learning and memory in rats. However, significant ($p < 0.005$) improvement is observed after the treatment with Indian instrumental classical music among stress-induced rats, which is comparable to Western instrumental classical music. The details will be dealt during the presentation.

Conclusions: Indian instrumental classical music is one of the very cost effective, easily reachable remedy in relieving the negative effects of stress-induced cognitive impairments.

Keywords: Indian music; Western music; Stress; Learning; Memory.

PP-G-12

Sleep Study (Obstructive Sleep Apnea) in Obesity

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Background: The World Health Organization (WHO) defines "obesity" as a BMI equal to or more than 30. Obesity is associated with diseases of the heart, malignant neoplasms, cerebrovascular diseases, diabetes mellitus, hypertension, disturbed sleep pattern, obstructive sleep apnea, etc. The disturbed sleep and obstructive sleep apnea in obesity is associated with several health problems like excessive day time sleepiness, cardiac arrhythmias, irritability, fatigue,

personality disturbances, industrial accidents, sudden death, transient ischemic attacks, etc.

Objective: The purpose of this study was to determine the differences in polysomnographic variables between obese individuals and healthy, normal-weight controls. The study is conducted to measure the impact of obesity on various sleep parameters like stages of sleep, apneic and hypopneic spells, oxygen saturation, limb movements and heart rate variability.

Design: A group of 50 obese individuals with a body mass index between 30 and 35 is selected for the study from the Department of Endocrinology, Madras Medical College. Fifty age and sex matched individuals are used as controls. RMS polysomnography is used to study the sleep pattern, oxygen saturation, nasal airflow, chest respiration, abdominal effort snoring, body position, electrocardiogram, pulse, electromyogram, limb movements, electrooculogram and electroencephalogram.

Results: The percentage of awake time of the total sleep duration is elevated in obese individuals compared to the healthy controls. The duration of REM sleep is reduced in obese individuals. Apnea–hypopnea index is greater than 5 in obese individuals. The total number of body movements is found to be significantly higher in obese individuals compared to the healthy subjects. The total number of tachycardia events is found to be significantly higher in obese individuals. There is no significant variation in the occurrence of bradycardia events in the control and obese groups.

Conclusions: The combination of obesity induced reduced pulmonary function and sleep disordered breathing can lead to progressive respiratory failure during sleep finally resulting in awake hypercapnic respiratory failure.

Keywords: Sleep study; Obstructive sleep apnea; Obesity; Polysomnography.

PP-G-13

To Study the Effect of Height on Nerve Conduction Velocity in Young Healthy Females

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Background: Nerve conduction studies are routinely performed in electrodiagnostic medicine to evaluate peripheral nerve function.

Objective: To establish the normal electrophysiological data for the median sensory nerve component and obtain relationship between height and nerve conduction study (ncs) in young healthy female individuals of Raichur city.

Design: Nerve conduction studies were performed prospectively in the right upper limb of 42 carefully screened, healthy, unmarried female individuals between the age group of 18 and 22 years and not on any medication. All the subjects were studied in the proliferative phase of the menstrual cycle during 9 AM to 12 PM using standardized technique in the Department of Physiology, Navodaya Medical College, Raichur.

Results: All values were expressed in mean±SD and Pearson-correlation coefficient was used for comparison. The mean age group for the 42 females was 19.6±1.16 (18 - 21) years, mean height 163.8±7.1 (149 - 179) cm, mean sensory nerve onset latency 3.0±0.2 (2.6 - 3.8), amplitude 32.7±11.4 (14 - 68) μv and conduction velocity 60.2±4.9 (47 - 70) m/s. On comparing, distal latency to height ($p > 0.05$). Where as amplitude to height $r = -0.14$ ($p < 0.001$) and conduction velocity to height $r = -0.020$ ($p < 0.05$) were statistically significant.

Conclusions: Normative conduction parameters in the upper limb for young healthy females established in our study suggested a negative correlation of amplitude and conduction velocity to height in healthy female subjects.

Keywords: Nerve Conduction Velocity; Amplitude; Latency; Female subject.

PP-G-14

Study of Auditory and Visual Evoked Potentials in Obese Individuals

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Background: Obesity is a chronic low-grade inflammatory disease associated with infiltration of macrophages and expression of high grades of inflammatory markers, which leads to oxidative stress causing damage to neurons and Schwann cells. Obesity has become implicated as a contributing cause of maculopathy. Oxidative stress plays an important role in the pathophysiology of maculopathy and retinopathy in the obese.

Objective: To study the auditory and visual evoked potentials in obese individuals.

Design: Individuals between the ages of 15 and 30 were divided depending upon the BMI with these grades - Grade I - 25 to 29.5, Grade II - 30 to 34.5 and Grade III - 35 to 39.5. The control group included 33 subjects. Subjects with pregnancy, any auditory or visual pathology, hypertension, diabetes mellitus, neurological disease, smoking and alcoholism were excluded from the study. BERA + VEP were recorded using RMS EMG EP mark-II digital polygraphy, India. Latency of I, III I, V III,V and inter peak latency was noted. Visual evoked potential (VEP) - latency & amplitude - N75, P100, N145 were recorded. Pure tone audiometry was performed.

Results: Pure tone audiometry showed no significant change. Auditory evoked potential (AEP) - latency of wave showed a significant increase in I – III – V in the obese. Inter peak latency showed no change. Visual evoked potential - P100-latency significantly increased in all groups. ($p < 0.005$).

Conclusions: The obese are prone to early development of sensorineural hearing loss (SNHL) changes in the auditory and optic nerves.

Keywords: Auditory evoked potential; Visual evoked potential; Obesity.

PP-G-15

Effect of Posture on Intraocular Pressure

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Background: The intraocular pressure (IOP) refers to the pressure exerted by the intraocular fluids on the coats of the eyeball. The normal IOP varies between 10 and 20 mm of Hg. Many different physiological factors that affect IOP are age, sex, obesity, blood pressure, exercise, diurnal variations and postural changes of the body. When a normal individual changes posture from sitting to supine, IOP changes to around 6 mm of Hg.

Objective: To study the effect of posture on intraocular pressure.

Design: A total of 100 subjects attending the Ophthalmology OPD at Navodaya Medical College Hospital and Research Centre, Raichur, were subjected to the clinical study. The IOP was recorded with the Perkins hand-held tonometer first in the supine position and then in the sitting position. Statistical analysis was done using Mann-Whitney test for comparison of the right and left eyes and Wilcoxon matched pairs test was applied to analyze the changes in the intraocular pressure during the sitting and supine positions.

Results: The mean difference of IOP between the sitting and supine positions was 1.93 mm of Hg in males and 2 mm of Hg in females. The changes in IOP between the sitting and supine positions were statistically significant ($p < 0.0001$).

Conclusions: The IOP is higher in the supine position than in the sitting posture.

Keywords: Intraocular Pressure (IOP); Posture; Perkins hand-held applanation tonometer.

PP-G-16

Impact of Sleep Deprivation on Mood and Recent Memory in Medical Students

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Background: Sleep is a vital biological process essential for physical & psychological restoration. Unfortunately, sleep loss due to voluntary bedtime curtailment has become a hallmark of modern life. Owing to their hectic schedules, medical students are known to have erratic sleep patterns and suffer from sleep disturbances and mood changes.

Objective: This study was designed to record the incidence of sleep deprivation and its impact on mood disorders and recent memory.

Design: A cross-sectional study was conducted among 100 medical college students. The subjects and controls were selected on the basis of a standardized questionnaire on Sleep Pattern and Epworth Sleepiness Scale score. Both groups were administered the DASS 21 questionnaire for mood disorders and recent memory was assessed using the PGI-BBD questionnaire.

Results: It was observed that 36% of the students were sleep deprived, 53% suffered from depression which significantly correlated ($p = 0.05$) with sleep deprivation and 64% reported anxiety, also correlating significantly with sleep deprivation ($p = 0.05$). Stress was seen in 59% though only mild stress had a significant correlation with sleep deprivation ($p = 0.05$). Recent memory dysfunction was found to be positively linked to disturbances in mild and moderate sleep deprivation.

Conclusions: Our study found a large segment of students being sleep deprived and its significant correlation with mood disorders and recent memory disturbances. We hope that these results will create awareness amongst the students of the crucial importance of good quality sleep in stabilizing mood and enhancing their performance.

Keywords: Sleep deprivation; Mood disorders; Epworth Sleepiness Scale (ESS).

PP-G-17

Age and Gender Variation in Efficiency of Motor Performance by Bimanual Coordination Test

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Background: In everyday life, both the hands should be used together and have to be finely coordinated to achieve our goals. The functional ability depends on age, gender, vision, muscle strength, coordination and dexterity of that person.

Objective: (1) To evaluate the efficiency of bimanual hand coordination among male and female subjects between the age group of 11 and 60 years. (2) To compare the efficiency of bimanual hand coordination between male and female subjects. (3) To correlate efficiency index with age in males and females.

Design: The study group included 60 healthy male and 60 healthy female subjects between the age group of 11 and 60 years. Ethical clearance was obtained. Informed consent was taken. The bimanual motor performance was assessed by the use of bimanual hand coordination test apparatus with electrical chronoscope. The time (T) taken for completion of the task and the error (E) committed was recorded by the chronoscope and efficiency index (E.I) was calculated as $E.I = (T-E)/T * 100$.

Results: The mean age of males was 32±11 years and females was 32±13 years. The efficiency index of males (95.08±5.24) was significantly higher than

females (92.16±6.69). Negative correlation of efficiency index with age was observed in males (r = - 0.412), (p= 0.00001) and females (r = - 0.453), (p=0.00001).

Conclusions: The efficiency index decreases with age in both males and females. Motor performance by bimanual hand coordination was better in males as compared to females.

Keywords: Age and gender; Bimanual coordination.

PP-G-18

Study of Relation of Iron Defeciency Anemia and Cognition Among School Children

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Background: Iron Deficiency Anemia (IDA) is the most prevalent disorder that goes unnoticed in children leading to an alteration in cognitive performance. Certain neuropsychological tests have been useful in determining these cognitive functions. Timely intervention and correction of anemia is very important to prevent this cognitive impairment.

Objective: (1) To determine the hemoglobin levels of 30 children. (2) To perform cognition tests including Raven's score and visual memory test. (3) To compare the cognitive status between anemic and non-anemic children.

Design: The study included 30 school going children aged between 9 and 12 years. Informed consent was obtained from the guardians. The subjects were screened for anemia by determining Hb (g%) and blood indices using a semiautolyser. The cognitive function was assessed by visual memory test and Raven's scoring. The cognitive status was then compared between anemic and non-anemic children.

Results: The mean age of the participants was 10.73 yrs; 50% were females. Of these subjects, 26.66% were anemic with a mean hemoglobin of 10.42 g%, while 73.34% were non-anemic with a mean hemoglobin of 12.16 g%. Raven's score was significantly low in anemic children [(mean+SD) 13.5+3.42] as compared to non-anemic children (19.27+2.41) with a p value of 0.000. Visual memory test was not significant between anemic and non-anemic children.

Conclusions: IDA leads to cognitive impairment and Raven's score is useful in the assessment of the same. This impairment can be prevented by timely intervention and treatment of IDA.

Keywords: Iron deficiency anemia; Cognition; School children.

PP-G-19

Correlation Between Neuropsychological Test Results (MMSE) and P300 Latency in Adults Above 50 Years

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Background: There is an increased incidence of cognitive impairment with age. A delayed P300 latency relates to slowed cognitive function in the normal elderly. The Mini-Mental State Examination (MMSE) is a widely used screening test for cognitive impairment in older adults.

Objective: (1) To determine the cognitive status of subjects above 50 yrs of age using MMSE & P300 latency. (2) To correlate MMSE scores with P300 latency.

Design: The study included 100 neurologically healthy subjects of >50 yrs of age. Informed consent was taken. The first MMSE was administered and scored.

The maximum score is 30 and a score lesser than 23 is associated with cognitive impairment. Then, the auditory P300 latency was recorded and correlated with the MMSE.

Results: The mean age of the study group was 62.58+6.85 years. There were 57 subjects with an MMSE score <23 out of which 15 were in the age group of 50 to 59 yrs. The auditory P300 latency (ms) was significantly delayed in subjects with an MMSE score <23 [(mean+SD) 321.08+10.31] as compared to subjects with an MMSE score >23 [309.54+7.16, p = 0.000]. There was significant negative correlation between P300 and MMSE (r = -0.3, p = 0.05) and between MMSE and age (r = -0.24, p = 0.05). Significant positive correlation was found between P300 and age (r = 0.3, p = 0.02).

Conclusions: One third of the subjects in this study were between the age group of 50 and 59 yrs with an MMSE score <23. MMSE correlates well with P300 latency. Hence, this can be used as a screening test to detect early cognitive impairment.

Keywords: MMSE; Auditory P300 latency (ms); Cognition; Older adults.

PP-G-20

Level of Serum Electrolyte in Depression Patients

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Background: Depression is one of the most common and recurrent disorders that affects people today. It affects a person's physical, emotional, social and psychological wellbeing.

Objective: The present study was conducted on depressed patients to know their relation with serum electrolyte (Na, K and Ca) levels.

Design: This study was conducted in the Department of Physiology, MLN Medical College, Allahabad. In this study, 64 subjects were randomly selected from the Psychiatric OPD of MLN Medical College and associated S Hospital, Allahabad. The subjects included 42 females and 22 males. Serum electrolytes (Na, K and Ca) by Kit in the department of Biochemistry in MLN Medical College and the results were compared with the control group.

Results: With the severity of depression, serum Na levels significantly increased which gave an evidence that the grades of depression is associated with an increased disturbance in the serum sodium levels in depression. The serum calcium levels were found to be significantly higher in depression patients as compared to the age-matched healthy control group.

Conclusions: We can conclude from our study that these ions have a role in the pathophysiology of the major depression disorder as there is a disturbance in the levels of serum sodium and calcium concentration in depression.

Keywords: Depression; Serum electrolytes; Sodium; Calcium.

PP-G-21

A Comparative Study of the Middle Latency Auditory Evoked Potentials in the Totally Blind and Normal Subjects

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Background: The totally blind individuals are often considered to be compensated for their visual loss by augmentation in the auditory and tactile perceptions as compared to the sighted individuals.

Objective: The objective of the present work was to compare the middle latency auditory evoked potentials (MLAEP) in the totally blind and the normal sighted individuals.

Design: In a cross-sectional study, MLAEPs were recorded in 20 totally blind females and compared with 20 age-matched normal sighted females. The mean latency and amplitude of the waveforms Na, Pa and Nb of MLAEP were measured and analyzed statistically using the Student''s t-test (two tailed, independent).

Results: The mean latencies of the waveforms Na, Pa and Nb were significantly reduced in the blind subjects as compared to the normal subjects ($p < 0.001$). The mean amplitudes of the waveforms Na, Pa and Nb did not show any significant changes between the two groups.

Conclusions: The reduced latency of MLAEP in the blind subjects in comparison to the normal sighted subjects probably indicates that the rate of information processing is faster in blind subjects because of the sensory compensation. This neuroplasticity increases the rate of auditory processing and attention in early blind subjects.

Keywords: Totally blind; Normal sighted; MLAEP; Neuroplasticity.

PP-G-22

Study On Color Blindness And Reduced Vision With Erythrocyte G6PD Enzyme Status Among The School Children Of Dhaka City

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Background: Apparently healthy school children may suffer from visual impairment due to undetected color blindness and/or reduced vision. It may be associated with erythrocyte G6PD enzyme deficiency.

Objective: To detect color blindness and reduced vision as well as to measure and to compare erythrocyte G6PD enzyme levels in apparently healthy school children in Dhaka city.

Design: This cross-sectional study was conducted from 1st July, 2007 to 31st June, 2008. Visual tests for color blindness and reduced vision were performed in 500 apparently healthy school children (6 to 12 years) irrespective of gender and race with estimation of their erythrocyte G6PD enzyme levels.

Results: Among the 500 study population, 13.8% children had defective vision of which 1% were color blind and the rest 12.8% had reduced vision (visual acuity <6/6 m). The mean erythrocyte G6PD enzyme level of the color blind group was significantly lower ($p < 0.05$). However, the mean erythrocyte G6PD enzyme level of the reduced vision and children with normal vision were almost similar.

Conclusions: Undetected color vision and reduced visual acuity is an important problem among apparently healthy school children.

Keywords: Color blindness; Reduced vision; Erythrocyte G6PD enzyme; Children.

PP-G-23

Comparative Study of Sleep Quality among Morning and Evening Batch Pharmacy Students

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Background: Good quality sleep is essential for health. For students, it is important to understand, evaluate and absorb knowledge. Sleep deprivation affects the normal physical and mental capabilities.

Objective: To examine and compare the sleeping behavior and to analyze sleep quality among students enrolled in different shifts.

Methods: The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate the sleep quantity and quality. Participating pharmacy students from the morning (n = 88) and evening batches (n = 100) filled the questionnaires successfully. After calculating the percentage of students with their sleeping times, the sleeping quality scoring data of both batch students was statistically analyzed using the two sample t-test. The results were computed by Minitab software version 14.0.

Results: The age range of students under study was between 18 and 21 years. Both the bedtime and getup time were reported late by 82% and 84% of the participating evening batch students only. Time taken to fall asleep was stated to be around 30 minutes in a greater percentage of both batches and sleep duration recorded was lesser than required in 96% of the morning and 64% of the evening batch students. Comparative statistical analysis of PSQI scores for the morning and evening batches and among gender indicated poor sleep quality in pharmacy students at a highly significant level ($p < 0.01$).

Conclusions: The study concluded poor sleeping habits/sleep quality at a highly significant level among pharmacy students that may affect their educational process and growth. Further cohort study is suggested to know the reasons and effects of sleep on the students' class performance and education record.

Keywords: Sleep quality; Morning and evening batch; Pharmacy students.

PP-G-24

Assessment of Hearing Loss in Term and Preterm Babies Admitted to NICU

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Background: High-risk term and preterm babies who require NICU care are at a greater risk for hearing loss. Regardless of the severity, early intervention to correct hearing loss in children improves speech development and conversational abilities.

Objective: The aim of the present study was to compare BERA findings in high-risk term and preterm NICU graduates.

Design: This cross-sectional study included 55 consecutive NICU graduates of Bapuji Child Health Institute, Davangere, at three months' followup visit; 24 of these were preterm and 31 were term babies. After taking a detailed history from the parents to elicit risk factors, the babies were sedated with Triclofos 20 mg/kg body weight and subjected to BERA.

Results: Of the 55 NICU graduates, 14 babies had normal BERA response. In the remaining 41 babies, no BERA response was recordable in 16 babies and the threshold for wave V was increased in 25 babies. The mean absolute latencies of wave I, III and V and IPL I – III and I - V were within normal limits. No difference was observed in the pattern of BERA in high-risk preterm and high-risk term babies.

Conclusions: Since most of the survivors in the neonatal intensive care units have one or more identified risk factors, their BERA testing is justified for early detection of hearing impairment and the implementation of hearing aid early in infancy in order to prevent acoustic deprivation.

Keywords: BERA; Hearing loss; Term; Preterm.

PP-G-25

Association of Consanguinity and Hearing Impairment

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Background: Hindus of South India particularly in the states of Karnataka, Andhra Pradesh and Tamil Nadu

strongly favor marriage between first cousins. Uncle-niece marriages are also widely contracted. One of the detrimental health effects associated with consanguinity is hearing loss.

Objective: To study the incidence and severity of hearing loss in deaf-mute children born of parental consanguineous marriages.

Design: This is a cross-sectional study involving 106 children aged between 1 and 5 years, referred for BERA for hearing impairment, during the last one year. After taking a detailed history regarding the risk factors, a thorough ENT examination was done and the children were subjected to BERA.

Results: Of the 59 patients with a history of consanguinity (Gp I), 43 had consanguinity alone as a risk factor and 16 patients had multiple risk factors including consanguinity. The remaining 47 patients (Gp II) had risk factors other than consanguinity. No BERA response was obtained in 30 of 59 children in Gp I and 10 of 47 children in Gp II. In the rest of the patients, the mean absolute latencies of wave I, III and V and mean IPL I–III and I–V, though within normal limits, were slightly higher in Gp I but the threshold of wave V was increased. In this study, consanguinity emerged as a major risk factor for hearing loss ($p < 0.05$).

Conclusions: A well-planned counseling program to create awareness of the adverse effects of consanguineous marriages will be helpful in preventing hereditary deafness.

Keywords: BERA; Consanguinity; Hearing impairment.

PP-G-26
Relationship Between Intraocular Pressures of Both the Eyes Before and After Water Ingestion

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Background: Intraocular pressure (IOP) is not uniform in both the eyes. Oral water ingestion increases blood volume and hence blood pressure which in turn increases the IOP. A hypothesis stating that an increase in IOP was not equal in both the eyes after water ingestion was tested.

Objective: To know the effect of water ingestion on IOP and the relation between IOP of both the eyes before and after water ingestion.

Design: A comparative study was conducted on 36 male medical students. IOP was recorded in the supine position using Schiotz tonometer, every 30 minutes for 2 hours, before and after water ingestion (2% of the body weight).

Results: It was found that water ingestion increases IOP of both the eyes; IOP of the left eye was insignificantly more by 0.2 mmHg than the right eye in the control trial but this was not so in the study trial. The transient increase in IOP was quick in the left eye than the right eye after water ingestion.

Conclusions: It can be concluded that there is a difference between IOP of both the eyes before and after water ingestion, whose cause cannot be clearly explained and therefore needs further in-depth study of the anatomical and physiological processes that govern the maintenance of IOP in both the eyes individually. This would also explain to a variable extent the etiology of some cases of unilateral glaucoma.

Keywords: Intraocular pressure; Water ingestion; Normal eyes; Glaucoma.

PP-G-27
A Study of Anterior Chamber Depth by Ultrasound A-scan Biometry

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Background: Measurement of the Anterior Chamber Depth (ACD) of the eyeball is important as alteration in depth may be associated with myopia, hypermetropia, primary angle closure glaucoma and their complications.

Objective: (1) To test whether there is a significant difference in ACD (mm) between the left and right eyeballs of an individual. (2) To test whether there is a significant difference in ACD (mm) between males and females. (3) To study the distribution of ACD (mm) according to age.

Design: A-SCAN ultrasound (contact technique) was done in both the eyes to measure the ACD in 256 subjects, aged 10 years and above, in the Regional Institute of Ophthalmology, Guwahati, Assam. An average of three readings was used to determine the final reading.

Results: Using t-test, the mean ACD (mm) in the right eye was found to be 3.19±0.42 mm and in the left eye to be 3.21±0.41 mm, which is not significant ($p > 0.05$). Further statistical analysis was done using the data of the right eye. The ACD in males was significantly deeper than females ($p < 0.05$), mean score of males being 3.27±0.39 mm and females being 3.11±0.43 mm. The mean distribution of ACD according to age showed a decrease in ACD with an increase in age.

Conclusions: This study shows that ACD between the right and the left eyes is almost homogeneous with males having a deeper anterior chamber than females. The depth of the anterior chamber decreases with age.

Keywords: ACD; Anterior chamber depth; A-SCAN; Axial scan.

PP-G-28

Effect of Refractive Error and Valsalva Maneuver on Intraocular Pressure

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Background: The normal intraocular pressure is around 10-20 mm Hg. Increased intraocular pressure (IOP) resulting in glaucoma is one of the major causes of blindness. An early detection of potential cases likely to develop a rise intraocular pressure will go a long way in preventing blindness. In the present study, effect of Valsalva maneuver is evaluated on the intraocular pressure.

Objective: To evaluate the effect of Valsalva maneuver on intraocular pressure in myopia and emmetropic subjects.

Methods: Subjects in the age group of 20- 40 years attending ophthalmology OPD were recruited for the study. The refractive error was assessed by streak retinoscopy and the intraocular pressure was measured by Goldmann's applanation tonometry. The subjects performed Valsalva maneuver by maintaining pressure at 30 mmHg and the IOP was measured during the maneuver.

Results: Eighteen myopic and 10 emmetropic eyes were studied. Mean resting IOP for emmetropic and myopic eyes were 13.80 ± 1.87, 14.22 ± 2.50 mm Hg respectively. The corresponding values during Valsalva maneuver were 15.10 ± 1.66 and 17.22 ± 2.34 mm Hg. There was a statistical increase in the IOP in normal and myopic subjects. The extent of change in the IOP was significantly higher in myopic when compared to emmetropic subjects ($p < 0.05$).

Conclusion

1) Increase in intraocular pressure with Valsalva maneuver was greater in myopic when compared to emmetropic subjects.
2) Valsalva maneuver can be considered as a screening test to identify subjects who have the potential risk of developing higher intraocular pressure.

FC-H-01

Sympathoexcitation-mediated Autonomic Imbalance in Nitric Oxide Deficient Hypertensive Rats: Role of Oxidative Stress

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Background: Disturbances of autonomic function are well recognized in hypertension. However, the underlying mechanisms are not clearly defined.

Objective: We hypothesize that these changes depend on sympathetic overactivity which characterizes hypertension. To test the hypothesis, we examined the role of sympathetic neural control on baroreflex sensitivity (BRS) and heart rate variability (HRV) in hypertensive Wistar rats.

Design: Hypertension was induced by acute inhibition of nitric oxide by injecting (i.v.) 30 mg/kg N-nitro-L-arginine methyl ester (L-NAME) in normal rats and after chemical sympathectomy by 6-hydroxydopamine. BRS was quantified from the heart rate response to changes in blood pressure induced by pressor and depressor stimuli. Time and frequency domain measures of HRV were calculated from 5-min electrocardiogram recordings.

Results: L-NAME treated rats showed a significant rise in blood pressure, augmentation of BRS, significant attenuation of standard deviation of normal R-R interval and high frequency spectral power of HRV along with a rise of low to high frequency ratio. A significant increase in serum lipid peroxidation suggested enhanced free radical generation in L-NAME treated hypertensive rats. Sympathectomy did not affect pressor effects of L-NAME; it however reversed the augmented baroreceptor responses of L-NAME. A significant decline in serum lipid peroxidation as well as HRV parameters in hypertensive rats after Sympathectomy was observed.

Conclusion: Cardiac autonomic responses in acute L-NAME induced hypertension are mediated primarily through sympatho excitation and oxidation stress is not a major contributing factor to these changes.

Keyword: L-NAME; Baroreceptor sensitivity; heart rate variability; sympathectomy

FC-H-02

Effect of hypoxia and hyperoxia on generation of Vascular Endothelial Growth Factor (VEGF) and Endothelial Nitric Oxide Synthase (eNOS) in pulmonary artery endothelial cells and its corelation with alteration in Reactive Oxygen Species (ROS) level

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Background: All organisms from humans to insects possess mechanisms to maintain oxygen homeostasis that are essential for survival. Endothelial cells, being the first cell layer in contact with blood, have to cope with all changes occurring within the blood. One of these changes is variation in oxygen tension which is to activate the endothelial cells and thereby initiating a cascade of reactions. In addition, hypoxia directly regulates the expression of different genes. Reactive oxygen species (ROS) is increased by hypoxia which probably plays a role as a second messenger. It is believed that ROS is increased during hyperoxia as well.

Objective: Thus in this study, we measured not only vascular endothelial growth factor (VEGF) and endothelial nitric oxide Synthase (eNOS) levels in porcine pulmonary artery endothelial cells during hypoxia and hyperoxia but also correlation with the alteration of ROS.

Design: Porcine pulmonary artery endothelial cells were cultured and exposed to hypoxia and hyperoxia. Total protein extract was done. ROS was measured through chemiluminescence. VEGF and eNOS were measured through the Western Blot.

Results: In our experiment, hypoxia caused a clear increase in ROS, VEGF and eNOS levels. However

surprisingly during hyperoxia, the ROS level decreased compared to normoxia and VEGF and eNOS were increased.

Conclusion: Our experiment results show that not only hypoxia but also hyperoxia may increase VEGF, eNOS and target gene expression but via different signal transduction pathway.

Keywords: VEGF; ENOS; ROS; Hypoxia; Hyperoxia.

FC-H-03

Cardiovascular Autonomic Functions Impaired in Patients Presenting with Anginal Symptoms with Normal Thallium-201 Myocardial Perfusion Spect

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Background: Some patients present with anginal symptoms in the absence of myocardial ischemia and other diseases that cause chest pain like angina. Physiologically whether they have altered cardiovascular autonomic function is not known.

Objective: To study cardiac autonomic activity and baroreflex sensitivity (BRS) in patients with angina, with and without myocardial perfusion defects.

Design: Short-term heart rate variability (HRV) and spontaneous BRS were studied in 61 consecutive male patients with angina and no other chronic systemic diseases and 30 healthy subjects (age 48±6.77 years). The myocardial perfusion of patients was assessed using thallium-201 myocardial perfusion SPECT. Thallium-201 was positive (myocardial perfusion defects) in 33 patients, age 54.91±7.43 years and negative (normal thallium scan) in 28 patients, age 53.04±8.50 years. Data were analyzed using ANOVA followed by Bonferroni and Kruskal Wallis, which was then followed by multiple comparisons.

Results: Surprisingly, the thallium negative patients had reduced HRV as compared to both the thallium positive patients [SDNN; 38.73±11.69 vs 27.38±9.54 ms, p = 0.001) and the healthy subjects (SDNN; 27.38±9.54 vs 42.15±10.03 ms, p = 0.001). Similarly, they had reduced BRS as compared to the thallium positive patients [19.20 (11.57 - 22.58) vs 10.70 (8.49-13.81), p = 0.001] and the healthy subjects [10.70 (8.49 - 13.81) vs 15.42 (11.24-18.82) ms/mmHg, p = 0.005] whereas the thallium positive patients had comparable HRV and BRS with the healthy subjects.

Conclusions: Patients with angina without any objective evidence of myocardial perfusion defects and other chronic systemic diseases had low cardiac autonomic drive and decreased baroreflex sensitivity. It appears that some cardiovascular regulatory central or peripheral autonomic mechanisms are disordered in such cases of patients.

Keywords: Angina; Myocardial perfusion defects; Cardiac autonomic drive; Baroreflex sensitivity; Thallium-201 myocardial perfusion SPECT.

FC-H-04

Systolic Pressure Variation as a Guide to Fluid Therapy in Mechanically Ventilated Patients after Open Heart Surgery.

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Background: Volume replacement is often required in hypotensive patients after cardiac surgery. venous pressure and pulmonary capillary wedge pressure may

not predict accurately which patients will respond to fluid therapy.

Objective: In this study, systolic pressure variation with its delta down component was compared with central venous pressure to know which patients respond to the fluid therapy.

Design: Twenty patients after cardiac surgery who had hypotension and who was on mechanical ventilation were studied. Baseline Central venous pressure and Systolic pressure variation were noted. After volume replacement, each patient was classified as responder or non-responder.

Results: There was a significant increase in CVP and decrease in SV and delta down. Delta down of >5 mmHg indicated that the fluid response was positive and more sensitive than CVP to predict which patients will respond to fluid resuscitation.

Conclusions: Systolic pressure variation and delta down is a sensitive indicator of response to volume infusion in patients on mechanical ventilation after cardiac surgery

Keywords: Systolic pressure variation; Delta down; Central venous pressure; Mechanical ventilation; Cardiac surgery.

PP-H-05

Inexpensive Electrode Design for Recording Monophasic Action Potentials (MAPs) from the Surface of Isolated Perfused Mammalian Heart

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Background: Monophasic action potential (MAP) electrodes are commercially available for research in animals and patients. These electrodes are expensive and have to be imported.

Objective: Our objective was to design an inexpensive and easy to make MAP electrodes for recording real-time, good-quality MAPs from the surface of isolated rat heart.

Design: Contact electrodes and suction electrodes were made for recording MAPs. Contact electrodes were made by modifying commonly available connectors of different diameters. Heart was harvested from rat after anaesthesia and perfused by a Langendorff perfusion system. Contact electrode was pressed on the surface of the heart for recording MAP. Suction electrodes were constructed using syringe needle caps. Suction was given by a connected syringe. Both type of electrodes had a central protruding active electrode and an adjacent reference electrode. The potential difference between the two electrodes was recorded using a generic data acquisition device (CMC DAQ) with an ECG pre-amplifier module. The change in the potential difference due to the propagating action potential was recorded as MAP on a laptop.

Results: MAP waveforms obtained were similar to the standard MAP waveforms with a fast clean upstroke and horizontal diastolic baseline.

Conclusions: MAP is not identical to cardiac action potential, but it very well reproduces the repolarization time course of the cardiac action potential. MAP electrodes can be easily made with inexpensive items and such electrodes can be used to teach cardiac electrophysiology and can also be used for research on the effect of drugs on repolarization.

Keywords: Monophasic action potential; Electrophysiology; Cardiac action potential; Isolated perfused heart.

PP-H-06

Ferricyanide Reductase is Present in Frog Aorta

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Background: In addition to mitochondrial electron transport, many cells possess a trans-plasma membrane electron transport system. A key enzyme of this system can transfer electrons from cytoplasm to extracellular, non-permeant ferricyanide converting it into ferrocyanide.

Objective: To see if such enzyme activity is present in the frog aorta.

Design: Ferricyanide reduction in presence of frog aortic tissue was monitored spectro-photometrically at room temperature. Similar tissue, denuded of endothelium or killed with formalin, was used as control.

Results: A steady increase in reduction of ferricyanide was noted in normal frog aortic tissue. Adequate controls were kept to account for spontaneous reduction. Tissue treated with formalin or denuded of endothelium showed very little activity.

Conclusions: Frog aorta shows ferricyanide reductase activity which resides mostly in the endothelium.

Keywords: Frog aorta; Ferricyanide reductase activity; Endothelium.

PP-H-07

Prevalence of ECG Abnormalities in Elderly Asymptomatic Males and Females

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Background: The health transition in India reflects the growing burden of cardiovascular diseases. The resting ECG can suspect or diagnose a large number of cardiac disorders. As a non-invasive, less expensive and simple technique, ECG may be even more useful in developing countries such as India. Therefore, the present study is undertaken.

Objective: To find out gender differences in the prevalence of abnormalities in ECG pattern in apparently healthy asymptomatic elderly subjects.

Design: This study was conducted in Solapur city in 400 apparently healthy asymptomatic subjects of age group 45 to 74 years. All participants underwent general and systemic examination, a personal interview assessing health history, personal habits including alcohol consumption and smoking, physical activity as well as Rose questionnaire for angina and intermittent claudication. The various ECG abnormalities were defined according to Minnesota code. The data was analyzed by applying Chi square test. The level of significance for correlation was tested using Chi square test at $P < 0.001$.

Results: Out of 400 ECGs recorded, 152 showed abnormalities in their ECG pattern. The various ECG abnormalities in decreasing order of frequency were LAD, sinus bradycardia, bundle branch block, ST-T wave abnormalities, LVH, Q/QS pattern, VPBs. We found highly significant increase in prevalence of ECG abnormalities in males as compared to females ($P < 0.001$).

Conclusions: Silent CVD in elderly can be picked up with the regular ECG screening. Males at high risk should be investigated for the underlying pathophysiological factors and some preventive therapies should be employed to decrease the burden of CVD.

Keywords: ECG abnormalities; Males; Females; Minnesota coding.

PP-H-08

Prevalence of Prehypertension and Association of BMI with Blood Pressure in Prehypertensive Subjects

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Background: Subjects with prehypertension have a greater risk of developing hypertension and cardiovascular diseases than those with lower blood pressure levels. Obesity is recognized as a major risk factor for the development of hypertension. There are few studies of the prevalence of prehypertension and its association with BMI in young adult males.

Objective: Aim of this cross sectional study was to determine the prevalence of prehypertension and its relationship with body mass index (BMI) in prehypertensive young adult males.

Design: A total of 170 healthy young adult males in the age group of 20 to 30 years were selected for the study. The blood pressure, weight and height of the subjects were measured and the BMI was calculated. The blood pressure measurements were categorized as normal or prehypertension using JNC VII Report. Prehypertension was defined as BP 120 to 139 over 80 to 89 mmHg.

Results: The mean age of the subjects was 21.9 years. The mean SBP was 132 mmHg and mean DBP was 82.59 mmHg. The mean BMI was 20.97 kg/m^2. The prevalence rate of prehypertension was 20%. Pearson's correlation test was applied to study the association of BMI and blood pressure in the prehypertensive subjects. Though not significant, a positive association has been found between both SBP ($r = 0.14$, $P = 0.42$) and DBP ($r = 0.14$, $P = 0.49$) with the BMI.

Conclusions: Prehypertension is highly prevalent in young adult males. There seems to be a positive association of blood pressure with BMI. Further studies with larger sample size are required to prove the same.

Keywords: Prehypertension; BMI.

PP-H-09

The Association of Systolic and Diastolic Blood Pressure in Under Weight, Normal Weight, Overweight and Obese Male Individuals in the Age Group Between 30 To 60 Years

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Background: Systolic blood pressure and diastolic blood pressure have shown a strong association with increased cardiovascular mortality and stroke in the elderly individuals. Obesity is an indirect risk factor for cardiovascular mortality because of its effect on hypertension, diabetes, etc.

Objective: To assess the association of systolic and diastolic blood pressure in underweight, normal weight, overweight and obese male individuals in the age group between 30 to 60 years.

Design: A total of 110 apparently healthy male individuals aged between 30 to 60 years were included and subjected to clinical examination. Weight and height were recorded and body mass index (BMI) was calculated by using Quetelets Index. Using BMI, the individuals were divided as underweight (BMI < 18.50), normal weight (BMI between 18.50 to 24.99), overweight (BMI between 25.00 to 29.99) and obese (BMI > 30.00). Blood pressure was recorded in sitting position on the left arm with a standard Sphygmomanometer by auscultatory method.

Results: There was a statistically significant increase in systolic blood pressure in overweight and obese individuals (P value < 0.05) and statistically significant

increase in diastolic blood pressure in obese individuals (P value < 0.05).

Conclusions: Our study showed a strong association of increased systolic blood pressure in overweight and obese individuals and increased diastolic blood pressure in obese individuals.

Keywords: Body Mass Index; Diastolic blood pressure; Obesity; Systolic blood pressure.

PP-H-10
Total Leucocytic Count and its Subtypes in Acute Coronary Syndrome

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Background: Atherosclerosis leading to acute coronary syndrome, includes inflammation as a key feature and leucocytes plays a major role. Present study is undertaken to observe any variation in leucocyte count, especially its subtypes in acute coronary syndrome which is very common in this region and limited studies had been carried out. Leucocyte count may turn out to be less expensive, reliable, easy to interpret and readily available test in future than currently available markers.

Objective: To observe any variation in the total leucocyte count especially its subtypes in acute coronary syndrome

Design: This was a hospital-based cross-sectional study. It comprised of 50 patients with acute coronary syndrome (50 control, age- and sex-matched) admitted in the Cardiology Department, Assam Medical College. Total count has been done manually using Turk's diluting fluid and the differential count using Leishman's stain.

Results: Average total leucocyte count in acute coronary syndrome cases was 10,004 cells/cmm (±3889.39) of blood and control 7,097 cells/cmm (±1459.68) ($p<0.01$) Differential count (%): Neutrophils = 72.9±10.86, Lymphocyte = 23.64 ± 10.29, Monocyte = 1.74±1.74, Eosinophil = 1.76±1.19, Basophil = 0.02±0.14 in the cases and Neutrophil = 66.04±5.64, Lymphocyte = 28.58±5.61, Monocyte = 2.38±1.21, Eosiniophil = 2.74±1.23, Basophil = 0.12±0.39 in the control. The differences were statistically significant ($p<0.05$) except basophil which is insignificant.

Conclusions: Patients with acute coronary syndrome have total leucocyte count in the higher normal range, especially neutrophils compared to the control.

Keywords: Total leucocytic count; Subtypes (differential count); Acute coronary syndrome; Neutrophil.

PP-H-11
Blood Pressure Response to Postural Change

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Background: Arterial blood pressure, an important physiological marker, attained great significance in the epidemiology of heart disease. Both SBP and DBP changes occur in different postures.

Objective: The aims of the study were:

1. To determine influence of change of posture on BP and
2. To find out whether there is any difference between males and females.

Design: A total of 100 healthy medical students (between the ages of 17 to 22 years), 50 males and 50 females, were selected. BP was recorded according to the WHO guideline using mercury sphygmomanometer between 9 to 10 am in the supine, sitting and standing postures. Three readings were taken in each posture and the average of the 3 was recorded.

Results: The average SBP (mmHg) of study population in supine, sitting and standing postures are 114.25±9.80, 110.41±9.12 and 108.88±10.23 and average DBP (mmHg) are 70.00±8.14, 73.71±7.74 and 75.42±8.65 respectively. The SBP is highest in supine followed by sitting and lowest in standing posture. The difference is significant between supine and sitting [p <.01], supine and standing [p <.001] but insignificant between sitting and standing [p>.05]. The DBP is highest in standing followed by sitting and lowest in supine. The difference is significant between supine and sitting (p<.01), supine and standing (p<.001), but insignificant between sitting and standing (p>.05). Similar significances were seen when males and females values were separately studied.

Conclusions: Thus change of posture is associated with change in the blood pressure in both males and females.

Keywords: Blood Pressure; Posture; Male; Female.

PP-H-12
A Study on Quality of Life in Patients Following Myocardial Infarction

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Background: Subjective wellbeing has been widely researched in the past few decades. It studies the various ways in which people evaluate their lives including concepts such as life satisfaction, work, health, etc. We started with the hypothesis that subjective wellbeing of post-acute MI patients must be poorer compared to normal subjects in the same age group as MI is a lifestyle disorder.

Objective: The objective of the study was to compare the quality-of-life parameters of post-MI patients with that of normal individuals.

Design: A comparative study between 50 normal subjects and 50 post-acute myocardial infarction patients was undertaken to compare their subjective wellbeing and current mental health status using the subjective well-being proforma and the General Health Questionnaire.

Results: The results showed higher negative affect such as inadequate mental mastery over immediate environment, perceived ill-health, deficiency in social contacts and a general ill-being about life in the MI group (p <0.05). The normal subjects showed a higher general wellbeing, positive affect, higher transcendence and higher perception of social support. (p <0.05) The GHQ yielded better sleeping habits, less anxiety, better perception of health and more satisfaction with life in the normal subjects compared to the post-acute MI patients. (p <0.05).

Conclusions: After the study, we concluded that young patients in the age group of 30 to 55 years had significantly higher levels of anxiety, poor sleep, less satisfaction with life and deficiency in social contacts compared with normal individuals in the same age group.

Keywords: Subjective wellbeing; General Health Questionnaire; Positive affect; Negative effect.

PP-H-13
Rate Pressure Product – A Useful Tool for Evaluation of Chest Pain in Middle Aged

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Background: Coronary artery disease (CAD) results from imbalance between the oxygen supply and the demand of the heart. Myocardial oxygen consumption (MVO_2) is a good indicator of the response of the coronary circulation to increased myocardial oxygen

demand. The internal myocardial work performed is represented by rate pressure product (RPP) and external myocardial work performed is generally expressed as stages of exercise.

Objective: To study rate pressure product in the middle aged with nonspecific chest pain to isotonic exercise.

Design: This is a retrospective cross-sectional study carried out in the Department of Medicine, JSS Hospital. The study group comprised of 43 patients in the age group of 40 to 50 years with a history of nonspecific chest pain but normotensive, nondiabetic and with normal resting ECG. Standard Bruce protocol was followed. Two groups were made: Group A (patients with typical angina) and Group B (patients without angina). Direct measurement of MVO_2 is difficult in routine clinical practice, but it can be easily calculated by indirect method such as the rate pressure product (systolic blood pressure x heart rate/100). Statistical analysis was done using SPSS version – 16.

Results: The mean rate pressure product was decreased in patients with angina (Group A) when compared to patients without angina (Group B). ($p < 0.005$).

Conclusions: Angina is precipitated due to an increase in the work of the myocardium as measured by RPP to a critical value that is essentially fixed in each patient. Most normal individuals develop a RPP of 20 to 35 mmHg × beats/min × 10^{-3}. In many patients with significant ischemic heart disease, RPP values exceeding 25 mmHg × beats/min×10^{-3} are unusual. Rate pressure product into the routine evaluation of patients with symptoms of coronary artery disease (CAD) is useful in the management of cases with CAD.

Keywords: Angina; Myocardial oxygen consumption; Rate pressure product; Treadmill test.

PP-H-14

Interrelationship Between Blood Pressure and Intraocular Pressure in Young Healthy Male Adults after Water Ingestion

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Background: Oral water ingestion increases blood volume and hence blood pressure (BP) which in turn increases intraocular pressure (IOP). A hypothesis stating that oral water ingestion does not uniformly increase BP and IOP of both the sides was tested.

Objective: To know the interrelationship between the BP and the IOP of both the sides, before and after water ingestion, in young male subjects.

Design: This comparative study was done in 36 male subjects. BP of both arms was recorded using sphygmomanometer by auscultatory method every 15 minutes and IOP was recorded using Schiotz tonometer at every 30-minute intervals for two hours in both trials (before and after water ingestion). Statistical analysis was done using paired t-test and regression analysis.

Results: It was observed that water ingestion led to a significant increase in BP and IOP of both the eyes. Significant correlation was present between the mean arterial pressure (MAP) and the IOP on the right side in both trials. However, there was no correlation between the MAP and the IOP on the left side in both trials.

Conclusions: It can be concluded that the correlation between BP and IOP, before and after water ingestion, is not uniform on both the sides. The cause cannot be clearly explained, and therefore, needs further in-depth study.

Keywords: Blood pressure; Intraocular pressure; Water ingestion.

PP-H-15

Hyperleptinemia and Hypertension

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Background: Hyperleptinemia is associated with risk factors for hypertension (HTN) including increased sympathetic activity, obesity, insulin resistance, renal pathology and vascular inflammation.

Objective: The objective of this work was to determine whether any association exists between hyperleptinemia and HTN.

Design: It was a case control study of 6 months' duration carried out at Shifa College of Medicine and Shifa International Hospital, Islamabad. We studied 128 male subjects, 64 with HTN and 64 without HTN. Leptin levels were measured by enzyme-linked immunosorbent assay (ELISA) technique.

Results: The patients with HTN versus the patients without HTN were smokers (39% to 10%), had a higher body mass index (27.04 +/- 0.43 to 24.31 +/- 0.375 kg/m2), RBS (167 +/- 7.32 to 132 +/-7.6 mg/dl), total cholesterol (160 +/- 4.72 to 158 +/- 3.74 mg/dl) and LEP (52.49 +/- 5.32 to 20.65 +/- 3.5 ng/ml) levels.

In univariate analysis, smoking, obesity, hyperglycemia and hyperleptinemia (with p values of 0.001) whereas in multivariate analysis, smoking, hyperglycemia and hyperleptinemia (with p values of 0.016, 0.006 and 0.001 respectively) were risk factors for HTN.

The present study therefore indicated that serum leptin levels are significantly higher in the patients of HTN as compared to the control group. Moreover, hyperleptinemia showed highest values of odds ratio in both univariate and multivariate analysis, thereby indicating that it may be a stronger risk factor than smoking, obesity and hyperglycemia for HTN.

Conclusions: We suggest that hyperleptinemia may be an independent factor in the development and progression of HTN.

Keywords: Hyperleptinemia; Hypertension; Smoking; Obesity; Hyperglycemia.

PP-H-16

Comparative Study of QTc Interval and Change in QRS Frontal Axis During Pregnancy

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Background: Pregnancy is a state of altered circulatory dynamics which may influence the QTc interval and QRS frontal axis. Hence, it is necessary to know normal range in healthy pregnant women.

Objective: To study QTc interval and QRS frontal axis during pregnancy and to compare with non-pregnant women.

Design: A total of 150 healthy pregnant women, in the age group of 20 to 35 years, who were attending OPD of Ob/Gyn, Shri BM Patil Medical College, i.e, 50 women in each trimester of pregnancy were chosen randomly, studied and were compared with 50 age-matched healthy non-pregnant women (control group). A 12-lead ECG was recorded and analyzed.

Results: The results were compared and analyzed using Z test. QTc interval (sec) in 1st, 2nd and 3rd trimesters of pregnancy and control were 0.39 + 0.01, 0.40 + 0.01, 0.41 + 0.01 and 0.38 + 0.01 respectively. QTc interval showed statistically significant increase in 1st, 2nd and 3rd trimesters of pregnancy ($p < 0.001$). QRS frontal axis (degrees) 1st, 2nd and 3rd trimesters and control were 60.48 + 11.5, 55.70 + 12.6, 45.4 + 22.5 and 64.56+7.6 respectively. QRS frontal axis showed statistically significant decrease in 2nd and 3rd trimesters of pregnancy.

Conclusions: Significant prolongation in QTc interval and decrease in QRS frontal axis during pregnancy compared to non-pregnant women was noted. A prolonged QT interval can cause serious cardiac rhythm such as ventricular tachydysrhythmias. Left axis shift can be explained from the fact that there is an increased blood volume which causes left ventricular load.

Keywords: Pregnancy; QTc Interval; QRS frontal axis.

PP-H-17

Comparative Evaluation of Electrocardiographic Patterns In Different Age Groups And Sex

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Background: With recent advances in cardiac surgery, there is a greater emphasis on the exact diagnosis of various anomalies either congenital or acquired. The electrocardiography is quite useful in such cases. Electrocardiographic diagnosis is increasingly concerned with early recognition of degenerative heart disease occurring in late middle life and minor changes are often emphasized as indicative of early myocardial damages. The most important step in electrocardiographic interpretation is the differentiation between 'normal' and 'abnormal'.

Objective: To identify electrocardiographic patterns in asymptomatic, apparently healthy male and female subjects aged between 16 and 60 years.

Design: Study was conducted on students and employees of Shri. BM Patil Medical Collage, Bijapur, and included 394 apparently healthy subjects (206 male and 188 female) aged between 16 and 60 years. The 12-lead ECG tracing of all subjects were obtained by using a BPL Cardiart 108T/MK ECG machine. The values of selected variables in ECG is summarized by standard descriptive statistics and expressed as mean+/-SD.

Results: QRS interval, QT interval and QRS axis in male subjects shows a significant correlation with BSA and BMI in age groups of 31 to 45 years, 16 to 30 years and 46 to 60 years respectively.

Conclusions: A comparison of our data with recently conducted epidemiological studies where effect of age, sex and race were studied, it showed that our data are generally in agreement with those data. Our data provides good reference value for different ECG parameters in normal Indian population of both sexes between 16 and 60 years of age.

Keywords: Electrocardiography; QRS interval; BMI; BSA.

PP-H-18

Correlation of Blood Pressure with Body Mass Index and Waist-to-Hip Ratio

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Background: Obesity is a problem not only in the developed countries but its incidence is increasing in developing countries such as India especially in the urban population. Assessment of obesity is done by various tests such as the body mass index (BMI), waist-to-hip ratio (WHR), etc. Obesity is always associated with many diseases, the commonest being hypertension.

Objective: To evaluate correlation of hypertension with BMR and WHR in middle-aged males.

Design: Males aged between 36 to 60 years were included in this study. The study group consisted of 100 newly diagnosed hypertensive males (hypertensive group). Control group consisted of 100 males who were normotensive. In both the groups, the blood pressure was measured in supine position by mercury sphygmomanometer. Body weight, height and hip and

waist circumference were measured. BMI and WHR were calculated. The results were analyzed statistically by using correlation coefficient and Z test.

Results: In this study, the systolic BP was not significantly correlated with high BMI or high WHR in the hypertensive group, but the diastolic BP was significantly correlated with high WHR and not with high BMI.

Conclusions: In Indian population in whom central obesity is more common, WHR can be considered as a better parameter of obesity than BMI to determine risk of hypertension.

Keywords: Blood Pressure; BMI; WHR.

PP-H-19
Electrocardiographic Changes in Normal Pregnancy

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Background: Pregnancy, a physiological phenomenon brings about remarkable changes in the cardiovascular system. Many of the physiological adaptations in the cardiovascular system of normal pregnancy alter the physical findings, thus sometimes misleading the diagnosis of heart disease. Pregnancy also brings about various changes in the electrocardiogram, further confusing with that of heart disease. Therefore, it is important to understand the physiological changes that occur during normal pregnancy.

Objective: To study the electrocardiographic changes in normal pregnancy and compare with normal non-pregnant women.

Design: Fifty consecutive normal pregnant women in the 2nd trimester and 50 consecutive normal pregnant women in the 3rd trimester, aged 20 to 35 years, attending Bapuji Hospital OPD, were enrolled for the study. Fifty normal non-pregnant women of the same age group were selected randomly from the general population as controls. A 12-lead ECG was recorded from all the participants and analyzed with special emphasis on QRS axis, Q wave and T wave changes.

Results: Our study showed that QRS axis deviated significantly to the left as the pregnancy advanced when compared to the controls. T-wave abnormalities such as flat and inverted T waves in leads III, V1 and V2 were more frequent in the pregnant group than controls ($p < 0.05$). There was increased incidence of occurrence of prominent Q waves in leads II, III and aVF in pregnant group as compared to the controls ($p < 0.05$).

Conclusions: Electrocardiographic changes in normal pregnancy should be understood for better management of those with cardiac disease.

Keywords: Cardiovascular changes; Pregnancy.

FC-I-01
Effect of Gender and Body Composition on Fractional Exhaled Nitric Oxide Levels in Healthy Adults

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Background: Measurement of the fraction of exhaled nitric oxide (FENO) is a recent marker of airway inflammation. The values are however dependent upon a number of factors including gender, race and anthropometric characteristics.

Objective: The objective of the study was to determine gender differences in the values of the fraction of exhaled nitric oxide (FENO) among healthy, non-smoking adults, and its correlation with body composition.

Design: This cross-sectional study was conducted at the Department of Physiology, College of Medicine and

King Khalid University Hospital, King Saud University, Riyadh. We studied 207 healthy, non-smoking, non-atopic, adult Saudi subjects (116 males and 91 females). The FENO was measured online at expiratory flow rates of 50mL/s using the single-breath technique by chemiluminescence procedure in accordance with the recent guidelines of the American Thoracic Society.

Results: The salient results in the study are that the FENO ranged between 5.7 parts per billion (ppb) and 46.6 ppb (mean 21.6±8.1), with >85% of subjects recording levels less than 30 ppb and >95% less than 40 ppb. The mean values were significantly higher in males (22.49±8.1) than in females (18.02±8.5, $p<0.001$). After correction for body composition and body surface area, the difference was non significant at the 25th, 50th and 75th percentiles. FENO negatively correlated with body weight ($r = 0.3888$, $p = 0.001$), BMI ($r = 0.238$, $p = 0.009$) and percentage of body fat ($r = 0.3926$, $p = 0.001$). No correlation was observed between FENO, FEV1/FVC ratio, age and height.

Conclusions: Males have significantly higher values of FENO than females. It is important to consider the body composition and gender while interpreting the values for FENO.

Keywords: FENO; Gender and body composition.

FC-I-02

Respiratory Pressures and Lung Mechanics in Young Adult Smokers and Non-smokers

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Background: A limited number of studies have reported respiratory muscle strength as an early indicator of pulmonary dysfunction in younger age groups. Hence, this study was carried out to study the same in young Saudi Arabian males.

Objective: To assess the effect of smoking and not smoking on the respiratory muscle strength in young Saudi Arabian males.

Design: Respiratory muscle strength was studied through maximal static inspiratory and expiratory pressures (PI max and PE max), maximum voluntary ventilation (MVV) and spirometric assessment, including forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), and FEV1/FVC ratio.

A total number of 376 subjects were inducted. Smoking was quantified by estimating the total numbers of cigarettes smoked and the smoking behaviour of the subjects was divided into four categories - never smoked, current smokers with <15 cigarettes a day, those who smoked 15 or more cigarettes per day and non-smokers. The non smokers formed the control group who had never smoked a cigarette. Former smokers were not included in this study. The pulmonary function parameters of all the subjects were determined by a portable, computerized, dry electronic spirometer 'Datospir-120' 511-800-MU2 (Gima), Italy.

Results: Mild smokers showed 01% increase in the FEV1/FVC ratio when compared to the non smokers. In heavy smokers, FEV1/FVC% decreased by14.7%. A 95% confidence interval between these relationships indicated a positive dose response effect. PImax was non significant in mild smokers and heavy smokers, whereas PEmax was significant in heavy smokers $p = 0.03$. MVV was significantly reduced in mild and heavy smokers ($p <0.0001$).

Conclusions: Heavy smoking was associated with a decline in respiratory muscle strength in this study. Smoking cessation programmes should form part of a major strategy to prevent an early decrease in the respiratory muscle strength in young people.

Keywords: Smoking; Anthropometry; Spirometry; PI max; PE max; MVV.

FC-I-03

Effect of Stove Intervention on Nasal Mucociliary Clearance Among Rural Women

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Background: Indoor air pollution is a major concern in rural India as nearly half of all households use wood as their primary fuel source for cooking. This could cause a deleterious effect on nasal clearance, which in turn may lead to frequent respiratory infections. Improved cooking stoves (ICS) were given to substantiate the reduction in smoke and improvement in respiratory function.

Objective: To estimate the nasal mucociliary clearance (NMC) in women using traditional cooking stoves and the changes occurring after using ICS.

Design: This is a longitudinal study which was done among 42 rural women in the age group of 17-65, who were using traditional stoves for over 2 yrs. The NMC was studied using the saccharine transit time (STT). The time elapsing until the first experience of sweet taste at the posterior nasopharynx following the placement of saccharine particle approximately 1cm behind the anterior end of the inferior turbinate was recorded as the NMC time. STT was repeated 10 days after using improved cooking stoves.

Results: STT in women using traditional cook stoves was (7.63±3.06 min) and it decreased after using ICS (6.99±3.03 min). The NMC improved after using ICS, though not statistically significant.

Conclusions: Our study impresses upon the role of improved stove usage in reducing the toxic substances that impair the NMC, a respiratory health indicator. Results of this study also highlight the need for the spread of awareness towards the exposure to cooking smoke and the advantages of using ICS.

Keywords: Nasal mucociliary clearance; Saccharine transit time.

FC-I-04

Effect of Aerobic Exercise Training on Pulmonary Function Tests: A Pragmatic Randomised Controlled Trial

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Background: Aerobic exercise is an important component of pulmonary rehabilitation for patients with chronic lung disease.

Objective: To evaluate the effect of aerobic exercise training on pulmonary function tests (PFTs) in young healthy volunteers.

Design: We recruited eighty apparently healthy medical students of both sexes, aged between 17-20 years. Randomization into experimental and control groups (40 each - 20 males and 20 females), was carried out using a table of random numbers. The experimental group participated in a 16 weeks aerobic exercise plan that involved five 20 minutes sessions of jogging in a week, with 5 minutes warm-up and 5 minutes cool-down exercises; while the control group had no exercise plans during that period of time. The participants were subjected to spirometry before the commencement of training and at the end of the training. Student's paired t-test was applied to compare the pre and post training values of both the groups. A test value of $p< 0.05$ was considered significant.

Results: The two groups were comparable for all the parameters at the baseline. After 16 weeks of aerobic training there was a significant increase in peak expiratory flow rate, forced vital capacity and forced expiratory volume in the first second in the experimental group. There was no significant change in the control group.

Conclusions: Aerobic training caused an improvement in pulmonary function which could be due to increased

expiratory muscle strength and endurance. In conclusion, the current study has shown that, there is a significant positive relationship between aerobic exercise training and pulmonary function tests.

Keywords: Aerobics; Exercise; Physical training; PFT's.

PP-I-05
A Comparative Study of Some Cardiorespiratory Parameters in Obese and Non - Obese Subjects

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Background: Obesity is associated with increased morbidity and mortality. Our study examines the differences in cardio-respiratory parameters in obese and nonobese Indian subjects.

Objective: To assess the differences in cardiorespiratory parameters like pulse rate, blood pressure, forced vital capacity and peak expiratory flow rate, in healthy male obese and nonobese adults.

Design: 200 male subjects: 100 obese (BMI >30 kg/m^2) and 100 healthy nonobese controls (BMI: 18.50 - 24.99kg/m^2), in the age group of 30 - 60 years were studied. Subjects with a BMI of 25 - 29.99kg/m^2, subjects <30years or >60 years of age, subjects with, cardiorespiratory illness, females and smokers were excluded from the study. Physical examination of all the subjects included measuring the height (in meters), weight (in kilograms), resting pulse rate and blood pressure. Forced vital capacity and peak expiratory flow rate were recorded on a computerized spirometer. Statistical analysis was by the unpaired 't' test.

Results: Our study, showed significantly higher H.R, SBP and DBP in obese subjects compared to controls. (Heart rate: Obese - 90.1±3.5 beats/min, Non - obese - 81.4±4.6 Beats/min; SBP: Obese - 142.4±7.9mm of Hg, Non - obese - 126.8±5.8mm of Hg; DBP: Obese group - 80.7±8.3mm Hg, Non-obese group - 74.1±5.1mm Hg). There was significantly lower FVC and PEFR in the obese subjects versus the controls. (FVC: obese - 1.9±0.3L, Non - obese - 2.8±0.5; $p<0.001$; PEFR: Obese group - 5.7±0.5L/SEC, Non-obese group - 7.7±0.8 L/sec, $p<0.001$).

Conclusions: Increased body weight is associated with an increase in mean HR, SBP and DBP, while the FVC and PEFR are reduced in young obese Indian males.

Keywords: Obesity; Spirometry; HR; SBP; DBP; FVC; PEFR.

PP-I-06
Respiratory Function of Rice Mill Workers in Sri Lanka

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Background: Rice is the major staple food in Sri Lanka. Hence, processing of rice is a major industry in Sri Lanka. Rice mill workers are exposed to organic and inorganic dusts that may have adverse effects on the respiratory function. There is a paucity of data on the respiratory function of rice mill workers.

Objectives: To determine respiratory symptoms and lung function in rice mill workers and compare the lung function of workers and controls with selected sociodemographic and environmental variables.

Design: A descriptive cross sectional study was conducted on 88 rice mill workers and 88 controls from the Maradagahamula area. The prevalence of selected respiratory symptoms and lung functions were assessed between the two groups and compared.

Results: The prevalence of cough, night cough, night shortness of breath, chest tightness, sore throat, running

nose, and wheeze ($p < 0.001$) were significantly higher in the rice mill workers. The mean peak expiratory flow rate (PEFR, $p<0.01$), mean forced expiratory volume in the first second (FEV1, $p<0.01$), mean forced vital capacity (FVC, $p<0.05$) and mean FEV1/FVC ratio ($p < 0.05$) were significantly decreased in rice mill workers when compared to the controls. The milling machine operators had the greatest deterioration of respiratory function.

Conclusions: Prevalence of respiratory symptoms in rice mill workers was higher than in the controls. There is an association between dust exposure and reduction in FVC, FEV1, and PEFR in the mill workers. A reduction in FEV1 and FEV1/FVC% of the lung function tests indicates an obstructive airway disease pattern in the rice mill workers.

Keywords: Respiratory function; PEFR; FEV1; FVC.

PP-I-07

A Comparative Study of Pulmonary Functions in Different Categories of Sportsmen

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Background: Regular exercise has proven to be beneficial for the human body. It is also a well known fact that athletic training has a significant effect on respiratory functions. Studies have confirmed that athletes have larger lung volumes and capacities than non-athletes of a comparable age group.

Objective: The present study was undertaken to assess the relation between the quality of exercise performed and the quantitative effect of these exercises on the lungs.

Design: Pulmonary function tests of male sportsmen engaged in various sports activities were recorded on body plethysmograph pulmonary function test machine (Elite Dx – model Med-graphics, USA), and were compared with each other and with that of the controls. Swimmers (n = 30) runners (n = 30), football players (n = 30) and basketball players (n = 30) in the age-group of 18 - 25 years were chosen for the study. Age and sex matched MBBS students who were not performing any athletic activity were chosen as controls. The parameters studied were forced vital capacity (FVC), forced expiratory volume at the first second (FEV1) and maximum voluntary ventilation (MVV).

Results: The results indicate that all the above sportsmen had higher values of pulmonary functions when compared to the controls, and these values were found to be statistically highly significant.

Conclusions: Among the various groups of sportsmen chosen for the study, swimmers showed the highest lung volumes and capacities.

Keywords: Pulmonary function tests; Swimmers; Football players; Runners.

PP-I-08

Comparative Study of Pulmonary Function in Pregnant, South Indian Women at 36weeks and Full Term Pregnancy

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Background: In the present study an attempt has been made to compare the pulmonary function at 36 weeks of pregnancy and in full term pregnancy.

Objective: To evaluate and compare the pulmonary function in pregnant South Indian women at 36 weeks of pregnancy and at full term.

Design: 60 pregnant women were assigned to two groups: study group I – 36 weeks of pregnancy and

study group II - full term antenatal cases recruited from women who visited the OBG Dept. of PESIMSR hospital, during the period 2008-2009. Inclusion criteria were: age group of 20 – 40 years, healthy, non smoking pregnant women, and exclusion criteria included: women <20 and >40 years, smokers, pre-eclampsia and hypertension. The baseline pulmonary functions were recorded with a computerized spirometer. The pulmonary function parameters evaluated were FEV1, FVC, FEV1/FVC, FEV25-75%, PEFR AND MVV. The data obtained was analyzed using Student t-test method.

Results: All the pulmonary function parameters were increased except for FEV1/FVC and PEFR in group II vs. group I, but this was not statistically significant. FEV1/FVC (group I: 91.0±10.6; group II: 88.4±12.9, p = 0.001) was decreased and PEFR (group I: 3.73±4.80 L/sec; group II: 5.06±4.77 L/sec p = <0.001) was increased in group II as compared to group I, and this was statistically significant.

Conclusions: At full term pregnancy, PEFR was raised while FEV1/FVC was decreased significantly as compared to 36 weeks of pregnancy in South Indian women. Our results are in accordance with several other studies. However, the pulmonary function of a larger population of pregnant women must be evaluated.

Keywords: Pulmonary function; Pregnancy; South Indian women.

PP-I-9

Assessment of Pulmonary Functions Among Beedi Industry Workers - A Preliminary Study

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Background: Occupational diseases are increasing worldwide and health hazards among tobacco workers are being reported globally. The prevalence of respiratory impairment among beedi workers in India is 23.5%. Prolonged exposure to low levels of tobacco dust may lead to respiratory impairment, thereby affecting the lung functions. Hence, this preliminary study was conducted in order to assess the pulmonary functions in the beedi workers.

Objective: To evaluate the pulmonary functions (PFT's) of beedi workers and to assess the gender variation and the association of duration of exposure to tobacco dust.

Design: This cross sectional study was conducted among 209 beedi workers from Tamil Nadu. Beedi workers of both sexes, aged between 20 to 50 years, who were working in the tobacco industry for >2yrs were included in the study. A health questionnaire was administered to the workers and an anthropometric assessment was done. Pulmonary function test was done using a portable data logging koko spirometer and bronchodilator reversibility was done to arrive at a diagnosis. The data was analyzed using SPSS software 15.

Results: Spirometric assessment showed restrictive (39.7%), obstructive (8.1%) and mixed patterns (23%) in beedi workers. Prevalence of respiratory symptoms was higher in exposed females (58.1%) than in males (41.8%) and it was statistically significant. A decline of PFT was also observed with prolonged exposure.

Conclusions: This study shows the respiratory impairment amongst beedi workers who are exposed to tobacco dust. The impairment of the pulmonary functions of the workers in tobacco industry will create awareness among the workers and enable the health officials to implement some interventions to reduce morbidity.

Keywords: Pulmonary functions; Beedi industry workers; PFT.

PP-I-10

A Study of the Changes in the Pulmonary Function in Coal Handling Workers After Prolonged Exposure to Coal Dust

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Background: Coal miners have long been recognized to be at an increased risk for several forms of pneumoconiosis; including macules, nodules, progressive massive fibrosis and silicosis, as well as other chronic lung diseases. So, the present study has been designed to study the change in the pulmonary function after prolonged exposure to coal dust in coal handling workers in Chennai.

Design: The study group consisted of 50 coal handling workers in the age group of 30 - 40 years. After getting written consent from them, the pulmonary functions like vital capacity (VC), forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), FEV1/FVC, peak expiratory flow rate (PEFR) and maximum ventilator volume (MVV) were recorded by using the "SUPERSPIROR". The volunteers representing the mixed socioeconomic group were categorized into obese cases and non - obese controls as per the standard criteria for body mass index (BMI). Pulmonary function tests were carried out with all the standard protocols. The statistical analysis comprised of the Student's t-test and linear correlation analysis.

Results: The result showed a significantly lower value of forced vital capacity (FVC) and forced expiratory volume in the first second (FEV1) in obese individuals and showed a statistically significant decrease in the values of FVC and FEV1 in the age group of 30 to 40 years. FEV1/FVC did not show a reduction.

Conclusions: This concludes that obese individuals presenting with greater morbidity may be more susceptible to altered pulmonary functions in this age group.

Keywords: Pulmonary function; Coal miners; Obese; Nonobese.

PP-I-11

Pulmonary Function Test in Obese Iron Ore Handling Workers

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Background: Obesity is an inflammatory disease that is associated with marked cardiorespiratory changes. Occupational exposure to air pollutants has shown an increased occurrence of respiratory diseases such as bronchitis and silicosis in miners and ore handling workers. The air pollution in mines and iron ore handling areas is complex and variable.

Objective: The present study has been conducted to study the changes in the pulmonary function in obese workers who work in iron ore mines after prolonged exposure to iron dust.

Design: The study group consisted of 50 obese iron ore handling workers in the age group of 40 - 50 years with at least 10 years of iron ore handling experience. After getting a written consent from them, the pulmonary functions like vital capacity (VC), forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), FEV1/FVC, peak expiratory flow rate (PEFR) and maximum ventilator volume (MVV) were recorded by using a "SUPERSPIROR".

Results: There was a significant decrease in the vital capacity, FEV1, FVC, MVV and PEF when compared with the predicted value. The FEV1/FVC ratio was significantly increased in the obese iron ore handling workers when compared with that of the non-obese controls.

Conclusions: It might be argued that the pulmonary function impairment in our study may have been due to dust induced diseases other than pneumoconiosis, notably chronic bronchitis.

Keywords: Iron ore handling workers; Vital capacity; Maximum ventilator volume; BMI.

PP-I-12

Physiology of Alternate Nostril Breathing (Nadisodhan Pranayama): A Conceptual Review

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Abstract:

This review study discuss about scientific basis of nostril breathing exercises and its probable relation with nostril and cerebral dominance. It also elaborates the basis of alternate nostril breathing and its effects on cerebral dominance and autonomic nervous system.

The airflow through one nostril is greater than next at any point of time which later switches to another. This is called nasal cycle. The nasal cycle lasts from 30 minutes to 2-3 hours. The nasal cycle occurs naturally. This nasal cycle is related with the cerebral dominance. When one nostril is dominant, the contra lateral hemisphere is active. The right nostril breathing leads to increased sympathetic activity while left nostril breathing decreases sympathetic activity and increases parasympathetic tone. So it has been speculated that these three phenomenon viz. nasal cycle, cerebral dominance and autonomic activities are correlated. This review also suggests that practicing alternate nostril breathing (Nadisodhan pranayma) regularly keeps the two hemispheres active and balances the sympathetic and parasympathetic activities in the body. Sympathetic or parasympathetic activity alternates automatically in our body which is important for our survival. Due to our hectic and stressful life, this naturally occurring alternate breathing cycle gets disrupted and we suffer from different ailments. These ailments are due to imbalance of autonomic nervous system which can be resolved by practicing alternate nostril breathing, the Nadisodhan pranayama. It's just like returning back to nature.

Keywords: ANB; Autonomic activity; Breathing exercise; Cerebral dominance; EEG; Pranayama.

PP-I-13

Evaluation of Pulmonary Function Tests in Patients Undergoing Laparotomy

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Introduction: Postoperative pulmonary complications are the most important cause of mortality in the postoperative period. These preventable complications can be diagnosed easily by noting changes in the pulmonary function parameters.

Objectives: 1) To compare and evaluate alterations in the preoperative and postoperative values of pulmonary function parameters. (TV, ERV, IRV, VC, IC, MVV, FVC, FEV1, FEV1/FVC, PEFR and PIFR).

2) To study the effect of gender difference, site of surgery and Body Mass Index on postoperative pulmonary function parameters as compared to their preoperative values.

Design: The study was conducted in the Department of Physiology, in collaboration with the department of Surgery and the department of Obstetrics and Gynecology of the institute. Only patients who were undergoing planned laparotomy were selected. Pulmonary function parameters were recorded pre-operatively one day prior to the surgery. Post-operative readings were taken on the fifth postoperative day. Pre-operative and post-operative comparisons were made by applying the paired t-test. The effect of gender, site of surgery and Body Mass Index on post-operative pulmonary function parameters were also analyzed by applying the same test. All the post-operative values were expressed as percentage change of the pre-operative values.

Results: We found that postoperatively there is a statistically significant decrease in all the PFT values

except that of FEV1/FVC, indicating restrictive type of ventilatory changes. Intergroup statistical analysis between male and female patients, patients undergoing upper abdominal surgeries and those undergoing lower abdominal surgeries, and between obese and nonobese patients showed that the extent of decrease in the PFT values were more in male patients, patients of upper abdominal surgery and obese patients.

Conclusions: After laparotomy, there is a significant decrease in all the PFT parameters and restrictive type of ventilatory changes in the postoperative period. These changes are responsible for the majority of postoperative pulmonary complications. These changes can be minimized by postoperative physiotherapy and breathing exercises and this should form an integral part of the integrated postoperative care.

Keywords: Pulmonary function tests; Laparotomy; Post-operative.

PP-I-14

Study of Yogic Breathing (Pranayama) on Pulmonary Function Tests in Tobacco Chewers and Non-tobacco Chewers

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Background: Yogic breathing (Pranayama) affects respiration and some of the parameters of pulmonary function tests after training. It is especially interesting to study the effect of yogic breathing (pranayama) on tobacco chewers which may help to improve respiratory functions.

Objective: To study the effect of yogic breathing (pranayama) on pulmonary function tests like FVC, FEV1, FEV1/SVC, SVC and MVV in tobacco chewers.

Design: 1) Anthropometric characteristics such as height (in cms.), weight (in kgs), BMI (kg/m^2) will be recorded in tobacco chewers and non-tobacco chewers. 2) The subjects will undergo yogic breathing (pranayama) training of a) Anulom – Vilom and b) Kapalbhati for three months. 3) Pulmonary function tests will be recorded in all the subjects by using an electronic spirometer, both before training and after a gap of 30 days, for three months.

Results: In the pilot study it is observed that there is a significant increase in FVC, FEV1, and FEV1/SVC ratio.

Conclusions: The study shows that yogic breathing (pranayama) can improve the pulmonary function tests in tobacco chewers.

Keyword: Yogic breathing; Pulmonary function tests; Tobacco chewers.

PP-I-15

Study of Pulmonary Function Tests in Multitransfused Children with Thalassemia - A Pilot Study

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Background: The precise cause for pulmonary dysfunction in thalassemia has not yet been established. Most studies have tried to correlate serum ferritin levels with pulmonary function abnormalities, but the results are conflicting.

Objective: To study pulmonary function tests in multitransfused children with thalassemia.

Design: Children with thalassemia on regular blood transfusion with or without iron chelation therapy were chosen for the study. Details such as age, sex, height, weight, age at first blood transfusion, cumulative volume

of blood transfusions, iron chelation therapy, pre transfusion hemoglobin level, mean ferritin level over levels in the preceding one year and physical examination findings were recorded on a proforma. Pulmonary function test was done using MIR Spirobank G spirometer within 3 days of blood transfusion and the percentage predicted value of forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), ratio of forced expiratory volume in the first second to forced vital capacity (FEV1/FVC), peak expiratory flow rate (PEFR), and mid peak expiratory flow (PEF25% - 75%) were taken.

Results: Percentage predicted values of FVC and FEV1 were decreased in 2 subjects, but were normal in 3 subjects. PEF 25% - 75% was decreased in 2 subjects; however, their predicted FVC and FEV1 were normal. Among our 5 subjects, 2 had restrictive lung disease, 2 had obstructive airway disease and 1 was normal.

Conclusions: Pulmonary function appears to be affected in a majority of subjects with thalassemia. Further studies are needed to establish the type of pulmonary dysfunction.

Keywords: Thalassemia; Pulmonary function test; Multitransfused ferritin.

PP-I-16

PEF Variability in Asthmatics

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Background: The prevalence of asthma and morbidity associated with it has increased exponentially in the past few decades. Peak expiratory flow rate, a lung function parameter is a major indicator for assessing bronchial responsiveness.

Objective: This study was aimed at comparing the diurnal variability of PEF in asthmatics and non asthmatics.

Design: A longitudinal study was conducted on 24 healthy subjects and 26 asthmatics. All participants were given mini Wright peak flow meter. On each day, three measurements were carried out at 6 am in the morning and at 6 pm in the evening. The highest value of PEF was taken for analysis. The amplitude percent mean was used for expressing the PEFR diurnal variability in this study.

Results: The PEF variability was significantly higher in asthmatics (10.25%) when compared to the values in the healthy individuals (5.90%). The circadian PEF rhythm was enhanced in asthmatics. Similar results were observed in the children too. PEF variability of the asthmatic children (11.07%) was higher when compared to that of healthy children (6.075%). Among the asthmatics, males had higher PEFR variability (13.22%) than the females (8.85%), while in healthy adults; females had a higher variability than males.

Conclusions: The pattern of diurnal rhythm observed in this study reflects the changes in the airway caliber in asthmatics. Measurement of PEFR variability is of great importance in clinical practice where it can be used to monitor bronchial hyper responsiveness, response to treatment and to define asymptomatic individuals at risk.

Keywords: Peak Expiratory flow rate; Asthmatics; Diurnal variation

PP-I-17

Comparison of Bronchial Responsiveness in Asymptomatic First Degree Relatives of Asthmatics and Patients of Allergic Rhinitis to Exercise with That of Healthy Controls

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Background: There is a tendency of bronchial lability in first degree relatives of asthmatics and in allergic

rhinitis patients. EIB is a proposed marker of the subclinical asthmatic process. It is necessary to identify individuals who are at risk of developing bronchial lability to exercise, to make necessary lifestyle and environmental alterations to prevent its onset.

Objective: Bronchial hyper responsiveness is significantly observed in asymptomatic first degree relatives of asthmatics and in patients of allergic rhinitis, in comparison to healthy controls without any history of either of the above, when challenged by the exercise test.

Design: The study was done by randomly selecting 34 asymptomatic first degree relatives of asthmatics (group I), 34 allergic rhinitis patients (group II) and 34 healthy controls (group III) in the age group of 16 - 35 years. The exercise protocol used was the standard 2 - step exercise test as per the WHO. PFT measurements were made before and after the exercise (at 0, 5, 10 and 20 minutes) using the kit micro (RS232). The criteria for labeling positive results for EIB was >10% reduction in FEV1, FVC, PEFR, or reduction of >35% in FEF 25 - 75%.

Results: ANOVA, paired t-test, mean, and SD were used to analyze the data. In our study, 20.6% of group I, 29.4% of group II, and 8.8% of group III subjects developed EIB. The difference between group II and III was statistically significant ($p = 0.031$).

Conclusions: It was concluded that EIB is a significant problem in group II and I as evidenced by post exercise fall in FVC, FEV1, PEFR.

Keyword: Bronchial hyperresponsiveness; Two-step exercise; Exercise induced bronchospasm.

PP-I-18

Effect of Yoga on Exercise Induced Bronchial Lability in Asthmatic Children

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Background: Bronchial lability, when combined with other triggering mechanisms results in clinical asthma. Studies have shown that yoga is effective in the cure and management of psychosomatic diseases, e.g. asthma.

Objective: To study the effects of yoga on exercise-induced bronchial lability in asthmatic children.

Design: 30 apparently healthy children without any family history of asthma were taken as controls (group I) and 30 asthmatic children attending pulmonology clinic of the institute were taken as cases (group II). Both groups were divided in two subgroups (groups Ia and IIa-not practicing yoga; and groups Ib and IIb-practicing yoga). The yoga groups (Ib and IIb) had performed yoga regularly for 45 minutes daily for 6 days/week, for 12 weeks. The Spirometry along with exercise testing was done at baseline, 6th and 12th weeks in all subjects. The responses to exercise were quantitated as the percentage rise and fall in the PEFR after exercise and exercise lability index (ELI).

Results: Group Ib (healthy, practicing yoga), had highly significant increases in VC, FVC, FEV1 and a significant increase in PEFR, and a decrease in ELI at 12 weeks. Group IIb (asthmatic, practicing yoga), had significant increases in VC, FVC, PEFR and a decrease in the percentage fall in PEFR and ELI at 12 weeks.

Conclusions: By reducing exercise-induced bronchial lability and improving pulmonary functions, yoga helps asthmatics as well as healthy children to cope better with vigorous physical activities. Thus, yoga could be an important adjunct to conventional asthma therapy.

Keywords: Bronchial lability; Yoga; Exercise; Spirometry.

PP-I-19

Comparison of Lung Functions in Healthy Male Swimmers and Non-Swimmers in the Age Group of 20 - 40 Years

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Background: Swimming is a fast-growing sport. This exercise increases maximal static pressure, augmenting the swimmer's ability to inflate and deflate the lungs. Therefore, it enhances lung functions in swimmers as compared to that of non swimmers.

Objective: To compare the lung functions in healthy male swimmers and non-swimmers.

Design: This is a comparative study of 100 subjects – 50 healthy male swimmers and 50 healthy male non-swimmers, who were selected from the Sports Authority of India (SAI), Bangalore. Subjects who satisfy both the inclusion and exclusion criteria were selected. With consent, a measurement of lung volumes and capacities were performed using a computerized multifunctional spirometer (Jaguer, Germany) as per the standard proforma.

Results: The results of present work indicate that swimming has a considerable effect on enhancing the lung functions. VC (4.52+0.2), FVC (4.66+1.44), FEV1 (3.90+1.13) and PEFR (7.20+3.58) were significantly raised in swimmers when compared to the non swimmers.

Conclusions: Swimmers have better lung functions as indicated by significantly enhanced VC, FVC, FEV1, and PEFR, thus aiding in the overall development and functioning of the respiratory system.

Keywords: Swimmers vital capacity; Forced vital capacity; Forced expiratory volume in the first second.

PP-I-20

Skeletal Muscle Function in Upper Limb in COPD Patients

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Background: Lower limb muscle function and overall physical activity in COPD have been studied in past, but there are a few studies regarding muscle strength and endurance in the upper limbs in COPD.

Objective: To compare the skeletal muscle strength and endurance in the upper limbs along with pulmonary function tests in diagnosed patients of COPD with normal subjects.

Design: 30 COPD patients and 30 normal subjects of statistically similar age, height and weight were included in the study. FVC, FEV1, FEF25 - 75 and PEFR were recorded by using MIR SPIROLAB 2 in both the groups. Upper limb skeletal muscle strength and endurance were tested by using the Hand Grip Dynamometer. The muscle strength and endurance were compared by applying the unpaired t-test among the control group and COPD patients. The correlation between FVC and FEV1 with muscle strength and muscle endurance was analyzed by applying the Pearson's coefficient.

Results: The mean muscle strength and endurance were significantly lesser in COPD patients than that in the normal subjects. There was a significant positive correlation between FVC and FEV1 with muscle strength in the COPD patients.

Conclusions: COPD affects the upper limb muscle strength and endurance. The pulmonary functions have a direct impact on skeletal muscle strength. Identifying those patients who have a greater reduction in strength and endurance will allow for early interventions targeted at increasing strength.

Keywords: COPD; Muscle strength; Muscle endurance handgrip.

PP-I-21

Effect of Short-term Practice of Yoga on Pulmonary Functions

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Background: The ancient science of yoga is known to promote health and prevent certain illnesses. Yogic practices have convincing scientific basis and produce consistent physiologic changes.

Objective: The present study was undertaken to ascertain whether a combination of various yoga practices for short duration is effective to improve pulmonary functions.

Design: Pulmonary function tests, viz. forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), FEV1%, maximum ventilatory volume (MVV), peak expiratory flow rate (PEFR), forced expiratory flow 25 to 75% (FEF 25 to 75%), maximum expiratory flow rate for 0.2 to 1.2 liters (MEFR 0.2 to 1.2 liters), inspiratory capacity (IC), tidal volume (TV), breath holding time (BHT) and respiratory rate (RR) were carried out in healthy males (n = 31) and females (n = 29) in the age group of 18 to 50 yrs. All the subjects underwent yoga practices over a period of 4 months (90 minutes/day) which included – i) various yogasanas ii) breathing exercises and iii) various shuddhi kriyas. At the end of four months, the same pulmonary function tests were repeated and the results were analyzed.

Results: It was found that the FVC, FEV1, MVV, PEFR, FEF 25 to 75%, MEFR 0.2 to 1.2 liters, IC & BHT all improved significantly, while TV, FEV1 percentage and RR remained unchanged.

Conclusions: The results suggest that practice of yoga even for a short duration is effective in the improvement of pulmonary functions, and ultimately for the fitness of an individual.

Keywords: Yoga; Pulmonary function tests.

PP-I-22

Effect of Hypertension on Lung Volumes

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Background: Hypertension is a global phenomenon and India is no exception. It contributes directly as well as indirectly to the morbidity and mortality of affected individuals. Though the effect of hypertension on the cardiovascular system is well known, its effect on lung function is not as well known.

Objective: To determine the effect of hypertension on lung volumes and capacities. Hypothesis to be tested - Studies have demonstrated that people with low lung volumes have a tendency to develop hypertension later in life. We tried to find out if the converse is also true, namely, if people with hypertension have lower lung volumes.

Design: A prospective study was done on 60 non-obese persons with a BMI <30. They were divided into two groups of 30 persons each. Group N (control) consisted of 30 normotensives and Group H (study group) consisted of 30 hypertensives. Spirometry was performed in both the groups with Spiro Excel (Medicaid). The lung volumes recorded included FEV1, FVC, ERV and MVV (MBC). The data was compiled and analyzed, and the results formulated thereon.

Results: Spirometric readings in Group H were lower than in Group N. FEV1 and FVC showed a significant reduction in Group H, whereas for ERV and MVV (MBC) the reduction was not significant.

Conclusions: We conclude that there is a significant reduction in FEV1 and FVC in hypertensive patients.

Keywords: Hypertension; Lung Volumes; Spirometry; BMI.

PP-I-23

Effect of Short Term Pranayama and Meditation on Respiratory Parameters in Healthy Individuals

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Background: Yoga, the ancient Indian science, aims to bring about functional harmony between the body and mind through asanas, pranayama and meditation. Recent studies on long-term yogic practices have shown improvements in respiratory functions. The present study was conducted to ascertain if a short term practice of pranayama and meditation had similar results in healthy individuals.

Objective: To assess the breath holding time, chest expansion and peak expiratory flow rate before and after the yoga practice, with respect to age, gender and Body Mass Index (BMI).

Design: 50 healthy subjects (24 male, 26 female) of the age group 20 - 60 years, fulfilling the inclusion and exclusion criteria underwent a yoga program daily for two hours for 15 days, taught by a certified yoga teacher. Pre and post yoga respiratory functions were assessed by measuring chest expansion, breath holding time and peak expiratory flow rate. The parameters were analyzed by the Student t-test.

Results: The study showed a significant increase in chest expansion ($p<0.001$), breath holding time ($p<0.001$) and peak expiratory flow rate ($p<0.001$) as compared to the pre yoga values. The response was similar in both the genders, both the age groups = 40 yrs and >40yrs, and both groups of BMI = 25 and BMI >25kg/m^2.

Conclusions: Regular practice of pranayama and meditation for a minimum of 15 days is beneficial in improving the respiratory functions even in healthy individuals, irrespective of age, gender and BMI.

Keywords: Pranayama; Meditation; Breath holding time; Peak expiratory flow rate.

PP-I-24

Preliminary Study of Pulmonary Functions In Petrol-pump Workers of Aurangabad City

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Background: The rapidly increasing number of automobiles in most cities has led to an increase in air-pollution and has become a cause of grave concern. Air pollutants derived from automobile exhaust and fuel vapors have become a major health hazard for certain groups of our society by virtue of their occupation.

Objective: To evaluate the effect of fuel vapors on the lung functions of petrol pump workers.

Design: By taking into consideration this occupational hazard caused due to inhalation of fuel vapors, the present study was carried out on 40 male petrol pump workers in age group of 20 - 40 years, who were working in petrol-pumps for more than 5 years. Spirometric parameters such as forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), maximum voluntary ventilation (MVV) and plethysmographic parameters like airway resistance (R_{aw}) were recorded on a body plethysmograph pulmonary function test machine (Elite Dx model, Med-graphics, USA).

Results: FVC, FEV1 and MVV showed a significant decline and Raw was increased as the period of exposure to fuel vapors increased.

Conclusions: Exposure to fuel vapors impairs lung functions in a time dependent manner.

Keywords: Spirometry; Plethysmography; Petrol pump workers.

PP-I-25

Study of Correlation of Serum Alpha-1 Antitrypsin (AAT) Levels and Pulmonary Function Tests in Patients Suffering From Chronic Obstructive Lung Diseases

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Background: Alpha 1 antitrypsin (AAT) is an important genetic risk factor that causes chronic obstructive lung disease (COPD). Smoking is also an important environmental risk factor for COPD. This is an innovative study that compared serum AAT levels without finding the genotype of the subjects as a marker of COPD prevalence.

Objective: To compare serum AAT levels in non smoker & smoker groups suffering from COPD, and in controls.

Design: The study was carried out in four groups of 30 individuals each - 1. Healthy individuals as controls, 2. Healthy smokers, 3. Non-smokers suffering from COPD, and 4. Smokers suffering from COPD. Pulmonary function tests were done to rule out COPD in controls and healthy smokers, and also for confirming the diagnosis in COPD patients and for categorizing them into different stages. Serum AAT levels were estimated by a quantitative turbidimetric method.

Results: The mean serum AAT value was 251.5±47.73 mg/dl in controls, 190.17±46.48 mg/dl in healthy smokers, 187.7±53.49 mg/dl in non-smoker COPD patients and 133.37±19.37 in smoker COPD patients. When compared statistically using 'ANOVA' test, the results are statistically highly significant with a $p < 0.001$.

Conclusions: As serum AAT levels were found to be less in smokers with or without COPD and non smokers with COPD, it can be stated that smoking is an additive risk factor in the prevalence of COPD, along with serum AAT as a genetic marker.

Keywords: PFT; Alpha 1 antitrypsin; COPD; Smokers.

PP-I-26

Effect of Pranayama Training on Pulmonary Functions And Body Mass Index

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Background: Pranayama which is a very important technique in yoga is the control and extension of 'prana' or vital energy or life force. Pranayama, if practiced regularly has a beneficial effect on the human body by interacting with various somato-neuro-endocrine mechanisms to have a beneficial effect on the whole body.

Objective: The purpose of the present study is to evaluate changes in pulmonary functions, body weight and body mass index due to regular pranayama practice.

Design: 50 healthy female subjects in the age-group of 30 - 55 years, having a sedentary life style, were given two months pranayama training. Spirometric parameters like forced vital capacity (FVC), forced expiratory volume in first second (FEV1), slow vital capacity (SVC) and maximum voluntary ventilation (MVV) were recorded on a body plethysmograph pulmonary function test machine (Elite DX-Model ,Medgraphics-USA). Body weight was recorded by an electronic weighing machine. All the parameters were recorded before undergoing pranayama training and after completion of two months of pranayama training.

Results: The results showed highly significant increased values of spirometric parameters and a significant decline in body weight and body mass index due to two months of pranayama training.

Conclusions: Effective and regular pranayama training improves pulmonary functions and reduces body weight and body mass index in females with a sedentary lifestyle.

Keywords: Pranayama; Pulmonary function tests; Body mass index.

PP-I-27

Shift Changes in Various Pulmonary Function Parameters in Ginning Mill Workers

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Background: In the northern part of Karnataka there are many ginning factories associated with the processing of cotton. However, there is no evaluation of pulmonary function status of the workers working with these factories.

Objective: The present study was planned to measure the over shift changes in the lung functions of the workers of a ginning factory in Bijapur district.

Design: The study was conducted on 67 subjects who were workers of a ginning factory in Bijapur. The tests were carried out on a monday. This was done to evaluate the problem on the first day of the week after a weekend break as suggested in various other studies. The interview was conducted based on the questionnaires early in the morning on Monday before the starting of the shift. The pulmonary function tests [FVC, FEV1, FEV1% and PEFR] were performed twice on the same day [8am - 10am and after 5pm] to assess the over shift change in pulmonary function.

Results: Shift changes are seen in FVC, FEV1, FEV1% and PEFR. There is a shift decrease of 7.19% in FVC, 11.34% decrease in FEV1, 4.68% decrease in FEV 1% and 10.73% decrease PEFR.

Conclusions: There was a significant change in the values of the pulmonary function parameters recorded at the end of shift from the values recorded at the begging of the shift.

Keywords: Ginning factory workers; PEFR; FVC; FEV1%.

PP-I-28

A Cross Sectional Study of Lung Function Tests in Different Trimesters of Pregnancy

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Background: Profound local and systemic changes in maternal physiology are initiated by conception and they continue throughout the pregnancy, which results in some changes in the parameters of ventilatory functions.

Objective: Objectives were to study the respiratory changes in pregnant women in comparison with non-pregnant women.

Design: 75 healthy pregnant women in the age group of 18 - 35yrs, who were attending the OPD of OBG, Shri BM. Patil Medical College, were chosen randomly for the study. This included 25 women in each trimester of pregnancy. who were studied and compared with 25 age matched healthy non-pregnant women (control group). A computerized spirometer was used for recording the respiratory parameters.

Results: Statistical analysis was done by unpaired Student's t-test. PEFR (L/s) in the 1st, 2nd & 3rd trimesters of pregnancy and the controls were 4.81±1.21, 5.03±1.31, 4.67±1.07 ($p<0.000$) & 6.29±1.16 respectively. PEFR showed a very highly significant decrease in all the trimesters as compared to the controls. MEP (mmHg) values in the 1st, 2nd & 3rd trimesters of pregnancy and the controls were 32.4±10.6 ($P<0.146$), 30.7±10.7 ($P<0.065$), 31.5±11.4 ($P<0.102$) and 38.3±17.2 respectively. The MEP shows a decrease in all the three trimesters of pregnancy when compared with the controls.

Conclusions: A significant decrease is seen in PEFR & MEP in all the trimesters of pregnancy as compared to the controls, with insignificant variations in the values

in different trimesters of pregnancy. As PEFR & MEP are indicators of expiratory muscle power, the regular breathing exercises from early pregnancy may help the pregnant women.

Keywords: Pregnancy; Peak expiratory flow rate; Maximum expiratory pressure.

PP-I-29
A Study of the PEFR Values in First Year Medical Students

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Background: Peak Expiratory Flow Rate (PEFR) is the greatest flow velocity that can be obtained during a forced exhalation, starting with the lungs fully inflated. It reaches a peak at around 18 - 20 years, maintains this level upto around 30 years and then declines with age. At any given age, the PEFR in males is higher than that in females

Objective: 1.To measure the PEFR values of the students. 2. To test whether there is any significant difference in the PEFR values between males and females. The hypothesis formulated is – There exists a significant difference in the PEFR values between males and females.

Design: The present study was conducted in the Department of Physiology, Gauhati Medical College, Guwahati. Healthy, first year medical students – male and female, in the age group of 18 - 20 years, with no history of respiratory diseases or smoking were included in the study. The PEFR was measured by a Mini Wright's Peak flowmeter. Three readings were taken in the standing position and the highest value was recorded as the PEFR.

Results: The mean PEFR value of the male students was found to be 507.98±97.7 L/min and that of the female students was found to be 328.28±55.86 L/min. There is a highly significant mean difference in the PEFR values between the male and female students ($t = 16.67$, $p < 0.05$). The hypothesis is accepted.

Conclusions: The PEFR values of the male students were found to be significantly higher than that of the female students.

Keywords: Peak flowmeter; PEFR.

PP-I-30
Habitual Cigarette Smoking Alters the Lung Function Parameters in Apparently Healthy Young Adults

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Background: Smoking is widely prevalent in both developed & developing countries. It is the single most important risk factor for reduced the lung functions in adults.

Objective: In this study, an attempt has been made to find the effect of habitual cigarette smoking on lung functions and to asses the relationship between the duration of smoking and lung dysfunction in apparently healthy young adults.

Design: A comparative study between apparently healthy habitual young adult male smokers (n = 40) and nonsmokers (n = 40) of the age group 17 - 35 years was carried out on students and employees of BLDEA's Sri BM Patil Medical College Bijapur. Various static and dynamic lung function tests were done on both the smokers and nonsmokers.

Results: We found a significant reduction in the values of forced expiratory volume in the first second (FEV1) by 0.27L, FEV1% by 9.52% and peak expiratory flow rate (PEFR) by 235 L/min, maximal expiratory pressure (MEP) by 45 mmHg in smokers ($p<0.001$) as compared

to nonsmokers. There is a direct relationship between FEV1% and an inverse relationship between FEV1 (L) to pack years (SI/20). There is a dose-response relationship between smoking and lower levels of FEV1 %.

Conclusions: Cigarette smoking is associated with evidence of reduction in lung function and mild airway obstruction, and slowed growth of lung function in young adults. Therefore, cessation of smoking and increased physical activity in young adult smokers at any time improves the lung functions.

Keywords: Cigarette smoking; Young adults; Pack Years.

PP-I-31

To Study the Effects of Ergoreflex on Respiration and Other Efferent Reflexes in Adult Male Patients With Chronic Obstructive Pulmonary Disease

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Background: In COPD, overactivation of ergoreceptors (intramuscular afferents sensitive to metabolic effect of muscle work) may be a link between peripheral changes, sympathetic overactivation and increased hemodynamic and ventilatory responses to exercise.

Objective: The current study was undertaken to test the hypothesis that ergoreflex in COPD patients is hyperactive, and contributes to breathlessness and exercise limitation. The aim of study was to - (1) Demonstrate its hyperactivity in COPD. (2) To record other efferent reflexes.

Design: Twenty stable COPD male patients aged 50 +/- 2.5 years and twenty healthy male subjects aged 48 +/- 3.5 years were studied under experimental and control groups. The ergoreflex contribution to cardiorespiratory parameters was assessed by post-handgrip regional circulatory occlusion method (PH-RCO) and computed as the difference in heart rate and respiratory rate response between PH-RCO and the control run without PH-RCO.

Results: The results were analyzed for significance between the two groups by repeated measures using ANOVA. COPD patients showed overactivation of ergoreflex as compared to control subjects in terms of heart rate during sustained hand grip (SHG) exercise (117 +/- 1.22 versus 89 +/- 0.89) beats/min, recovery heart rate ($p < 0.001$), respiratory rate during SHG (24 +/- 0.54 versus 19 +/- 03.24) breaths/min and recovery respiratory rate ($p < 0.001$). The degree of overactivation of ergoreflex was significant in COPD patients ($p<0.001$).

Conclusions: In COPD, overactivity of ergoreflex is associated with abnormal cardiorespiratory reflex control. COPD patients showed overactivation of the sympathetic nervous system as evidenced by heart rate changes during exercise and delayed recovery.

Keywords: Ergoreflex; Sustained hand grip exercise; COPD; Sympathoexcitation.

FC-J-01

Comparative Study of Human Model Constructions in Different 3D Digital Human Modeling Softwares

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Background: The present day technology for ergonomic evaluation of products and workstations in the virtual environment is digital human modeling (DHM) and simulation. All the companies which market DHM softwares demand that their product is anatomically and biomechanically most accurate.

Objective: Hence, the present communication focuses on comparative assessment of constructions of digital human models (manikin) by different DHM softwares with special emphasis on the spinal structure.

Design: Three popular DHM softwares namely Jack, Ramsis and Delmia were taken into consideration for this purpose. Manikins of these 3 softwares were compared in terms of number of body segments and joints; range of movement and degree of freedom of body joints; kinematic control of segmental movements; modes of representation; etc.

Results: Comparisons revealed that the anatomical and biomechanical characteristics of manikins generated by the 3 softwares under study were significantly different from each other even when they were generated by using same anthropometric database. Moreover, the number of key anthropometric variables needed to define a manikin was found dissimilar. Although, all these 3 softwares represent articulated spinal model, only the Jack software provides movement at each of the 17-moveable segments (thoracic and lumbar). It is worthy to mention that the bony skeletal system representation mode is only available in the Ramsis software. Due to this unique feature, it is possible to visualize the kinematics of bone movements during simulated activities.

Conclusions: Following the comparison, it is unwise to select any software as the best one as all these softwares have better qualities in some aspects while it is lacking in some other features.

Keywords: Digital human model; Ergonomic evaluation; Spinal model.

FC-J-02
Effect of Endurance Exercise on Brain Natriuretic Peptide (BNP)

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Background: Enlarged heart in athletes is a beneficial adaptation enabling the athlete to perform more work. BNP is predominantly synthesized and secreted from the ventricles in response to stretch. BNP promotes diuresis, natriuresis, hypotension and smooth muscle relaxation though the mechanism is unclear.

Objective: To evaluate the effect of maximal exercise on level of brain natriuretic peptide (BNP) and cardiac adaptive changes in endurance-trained elite athletes.

Design: Setting: Army Medical College in collaboration with the Armed Forces Institute of Cardiology (AFIC) at Rawalpindi. Study Design: Cross-sectional comparative study. Sampling: 22 elite endurance athletes and 22 matching sedentary controls. Methods: Height, body weight, BP, pulse rate were recorded. Blood was drawn for measuring BNP and aldosterone before exercise and again after exercise. The echocardiography of the left ventricle was done to measure the LVIDd, IVSTd and PWTd. The LVM was calculated by Devereux formula.

Results: The heart rate and BP of athletes were significantly lower than controls ($p < 0.001$) while LVIDd, IVST, PWTd, and LVM were greater in athletes than controls ($p < 0.001$). Similarly, plasma levels of BNP and aldosterone were significantly higher in athletes than controls ($p < 0.001$).

Conclusions: Systolic and diastolic blood pressure and heart rate are lower in endurance elite athletes than matched sedentary controls. Maximal exercise increases the level of brain natriuretic hormone (BNP) in elite athletes significantly as compared to sedentary healthy controls; this could be due to an adaptive change in the athlete's heart.

Keywords: Endurance exercise; Endurance elite athletes; Adaptive changes; Heart; Blood pressure; Heart rate; Brain natriuretic peptide.

FC-J-03

Influence of Yogic Practice on Inflammatory Cytokines

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Background: Inflammatory factors play an important role in genesis of cardiometabolic diseases. Low-grade systemic inflammation initiates atherosclerotic changes and influences the development of metabolic disorders. Elevated pro-inflammatory cytokines such as interleukin-6 (IL-6) and tumor necrosis factor alpha (TNF-alpha) are sensitive indicators of systemic inflammation.

Objective: To study the influence of yogic practice on the TNF-alpha and the IL-6 levels.

Design: In the present study, 21 subjects in the age group of 20 to 60 years performed Shuttle Walk Test, attaining exercise of mild to moderate degree. Anthropocentrically matched subjects who practiced yoga (asanas and pranayama) for more than 5 years performed similar exercise protocol. TNF-alpha and IL-6 levels in both the control and the yoga groups were estimated before and after the exercise protocol by using the sandwich ELISA technique.

Results: At rest, the TNF-alpha and the IL-6 levels were lower in yogic group when compared to the control group; the difference in TNF-alpha levels was significant ($p < 0.05$). There was an increase in the TNF-alpha and IL-6 levels after the exercise, but it was not statistically significant. In the yoga group, the rise in IL-6 was significant ($p < 0.05$).

Conclusions: Regular practice of yoga reduces the levels of inflammatory cytokines such as the TNF-alpha and the IL-6. A significant increase in the IL-6 after a bout of exercise in the yogic group may facilitate an anti-inflammatory response. This modulation of inflammatory cytokines is likely to favorably impact the health status in the yogic group.

Keywords: Interleukin-6; Tumor Necrosis Factor Alpha; Inflammation; Yoga.

FC-J-04

Effect of Yogic Exercises on Motor Performance Among Computer Users: A Randomised Controlled Trial

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Background: Upper extremity musculoskeletal disorders (MSD) are very common in regular computer users. Computer usage is the leading cause of work-related illness.

Objective: The objective of the present study is to evaluate effectiveness of yogic exercises in the improvement of motor performance of the upper limbs among computer users.

Design: Sixty study participants were randomly divided into two groups - yoga with counseling and only counseling group for a period of 12 weeks. Symptom severity scoring and functional status scoring were done using the self-administered Boston Carpal Tunnel Questionnaire. Motor performance was assessed using handgrip strength and endurance, median nerve conduction velocity and bimanual co-ordination before and after intervention.

Results: There was significant reduction in symptom severity score ($p = 0.002$) and improvement in the functional status score in yoga with counseling group when compared to the only counseling group. There is also a significant decrease in self-reported symptoms such as myalgia ($p = 0.019$). Handgrip strength had increased in yoga with counseling group for both the hands (statistically not significant). Yoga with counseling group had shown significant improvement in right median nerve conduction velocity as compared to counseling ($p < 0.006$). The participants of yoga with counseling group had shown significant decrease in error during bimanual coordination ($p = 0.003$) and efficiency index had shown a trend towards improvement.

Conclusions: The present study showed a yoga-based regimen is more effective than counseling alone in relieving computer-related musculoskeletal disorders.

Keywords: Yoga; Computer users; Motor performance; Handgrip strength; Nerve conduction velocity; Bimanual coordination.

FC-J-05

A Comparative Study of Maximal Oxygen Consumption by Queen's College Step Test and Treadmill Jogging Test in Young Males

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Background: Cardiopulmonary fitness is a powerful predictor of all causes of cardiovascular disease and mortality. Maximum oxygen consumption is the internationally accepted parameter to evaluate cardiorespiratory fitness.

Objective: To compare and correlate the VO_2max yielded by Queen's College Step Test (QCT) and Treadmill Jogging Test (TMJ) in young male subjects.

Design: Sixty young healthy male subjects in the age group of 18 to 22 years were included in this study group. Cardiorespiratory fitness in terms of VO2max was assessed indirectly by following the protocol of QCT and TMJ.

Results: VO_2max QCT and VO_2max TMJ showed a highly significant correlation ($r = 0.94$ $p < 0.001$) with each other indicating that both methods yielded similar trends in the values of estimated VO_2max. VO_2max QCT and VO_2max TMJ in both these ranges were outside the limits of agreement; the two methods are neither equivalent nor can be used interchangeably. However, the mean values of VO_2max yielded by TMJ (51.14±2.54) was significantly higher than the QCT values (47.32±4.11) ($p < 0.001$). VO_2max TMJ can be calculated by using QCT VO_2max values using the following prediction equation found from our data with a prediction accuracy of 94%. TMJ VO_2max = 0.58 × QCT VO_2max + 23.62.

Conclusions: The results suggest that VO_2max determined by TMJ yields higher values as compared to QCT VO_2max values. Cardiorespiratory fitness can be evaluated by QCT as it is much simpler to administer in field conditions and does not require specialized equipment.

Keywords: VO_2max; QCT; TMJ; cardiorespiratory fitness.

PP-J-06

The Effect of Combined Yoga Practice on Certain Respiratory and Cardiovascular Parameters in Young Adults

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Background: Reports indicate the effectiveness of selective yoga practice on improving the functioning of various systems in the body. The effectiveness of combined yoga practice on the respiratory and cardiovascular parameters has not been documented well.

Objective: The current study was designed to evaluate the effectiveness of combined yoga practice on certain respiratory and cardiovascular parameters in healthy Malaysian adults.

Design: Male volunteers were recruited for the study after taking their informed consent. They were trained to practice a mixed set of yoga techniques daily. The selected yoga practices were: Simhagarjan, Uthitha

lolasana, Kastatakshana, Lolasana, Ujjaiya Pranayama, Nadishodana, Kapalabhati, Bhastrika, Brahmari. Respiratory parameters (using Cosmed MicroQuark PC Spirometer) and cardiovascular parameters (using BPL Cardiart 8408 View) were recorded before starting the yoga practices and after ten days of yoga practice. Statistical analysis was done by using paired t-test. Differences were considered to be significant at $p < 0.05$.

Results: Respiratory parameters: FVC, FEV1/FVC% and PEF significantly increased in the subjects when compared to their baseline values. Cardiovascular parameters: The resting heart rate and systolic blood pressure was decreased in subjects when compared to their baseline values, but these changes were not statistically significant.

Conclusions: Our preliminary results show that yoga practice significantly increased FVC, FEV1/FVC% and PEF in healthy adults. It also decreased the resting heart rate and systolic blood pressure in subjects. The study gives an insight into the beneficial effects of combined yoga practice for a short period in improving the lung function.

Keywords: Combined yoga; Young adult; FVC; Heart rate.

PP-J-07

A Study of Effect of Body Mass Index and Waist-to-hip Ratio on Cardiorespiratory Fitness in Young Males

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Background: A low cardiorespiratory fitness in young adults has emerged as an important factor for developing cardiovascular comorbidities later in the middle age. Increased body fatness, as predicted by body mass index and waist-to-hip ratio, is an additional factor for developing cardiovascular diseases.

Objectives: The objectives of the study are to determine the cardiorespiratory fitness in terms of VO_2max by Queen's College step test in young male subjects, to study the relation between body mass index (BMI) and cardiorespiratory fitness, to study the relation between waist-to-hip ratio (WHR) and cardiorespiratory fitness and to compare the effect of BMI and WHR on the cardiorespiratory fitness.

Design: Eighty young healthy male subjects in the age group of 18 to 25 years were included in this study group. BMI and WHR were measured. Cardiorespiratory fitness in terms of VO_2max was assessed by following the protocol of Queen's College Step Test (QCT).

Results: There was a significant negative correlation between BMI and VO_2max (ml/kg/min) (correlation coefficient = -0.73, $p < 0.001$) and also there was a significant negative correlation between WHR and VO2max (ml/kg/min) (correlation coefficient = -0.40, $p < 0.001$).

Conclusions: The results suggest the striking effect of body fat on cardiorespiratory functions. In our study, both BMI and WHR have significant negative correlation with VO_2max, but BMI has a highly significant negative correlation with VO_2max.

Keywords: VO_2max; QCT; Body mass index (BMI); Waist-to-hip ratio (WHR).

PP-J-08

Effect of Six Weeks Yoga Training on Physical Fitness and Aerobic Capacity In Healthy Indivduals

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Background: The prevalence of cardiovascular diseases has increased substantially over the past few

decades. It is now established that low fitness is one of the risk factors for increased cardiovascular mortality. Yoga practice, which improves stretch flexibility and controls various physiological variables, has been shown to improve fitness of an individual.

Objective: The present study is done to know the effects of six weeks of yoga practice on physical fitness and aerobic capacity in healthy individuals.

Design: This study includes 41 healthy subjects between the age group of 20 and 60 years (female = 19, male = 22). They were given Asanas, Pranayama and medication training for a period six weeks. Pulse rate, systolic blood pressure, diastolic blood pressure, VO_2max by Queen's college step test and physical fitness index were assessed before and after the yoga training. Data was analyzed using ANOVA.

Results: Results showed that pulse rate, systolic blood pressure and diastolic blood pressure were significantly reduced ($p < 0.05$), VO_2max and PFI were increased ($p < 0.005$) and in both genders VO_2max and PFI were also significantly increased ($p < 0.001$) after six weeks of yoga practice.

Conclusions: From the study, it can be concluded that six weeks of yoga practice improves physical fitness and aerobic capacity in healthy individuals.

Keywords: Yoga; Aerobic capacity; Physical fitness.

PP-J-09
Oxidative Stress in Different Intensities of Short-Duration Aerobic Exercise in Young Healthy Sedentary Individuals

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Background: The effect of exercise intensity on the oxidative stress is not clearly understood. The results of previous studies have not been consistent.

Objective: To study the effects of two different intensities of submaximal aerobic exercise on plasma malondialdehyde levels.

Design: Fifty male subjects were recruited and divided into 2 groups. Group I performed exercise at 50% maximal heart rate and Group II performed exercise at 75% maximal heart rate on a load adjustable cycle ergometer. Venous blood was collected before and after exercise and serum malondialdehyde levels were assessed using thiobarbituric acid test. Serum lactate levels were also assayed using a kit.

Results: There was a significant increase in the malondialdehyde levels in serum when exercise was performed at 50% maximal heart rate ($p < 0.05$) whereas the increase in malondialdehyde levels at exercise performed at 75% maximal heart rate was not statistically significant ($p = 0.18$). However, there was no statistical significance in the change in the malondialdehyde levels when compared between the two groups. There was also a significant increase in the lactate levels ($p < 0.001$) in the higher intensity exercise which was not seen in the lower intensity.

Conclusions: The study results indicate that there is evidence of oxidative stress occurring at submaximal aerobic exercise, but it does not seem to be directly related to the intensity of exercise.

Keywords: Oxidative stress; Submaximal aerobic exercise; Intensity; Sedentary.

PP-J-10
Muscle Endurance Testing in Sedentary Information Technology Professionals

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Background: Obesity is a health condition in which excess body fat has accumulated to the extent that it

may have an adverse effect on the health leading to reduced life expectancy and/or increased health problems. Individuals working in information technology (IT) industry have a sedentary lifestyle which contributes to anxiety, cardiovascular disease, depression and diabetes. Informational technology workers are characterized by sitting or remaining inactive for most of the day with little or no exercise.

Objective: The present study has been put forward to assess the muscle endurance in obese IT workers.

Design: The subjects were divided into four groups between the ages of 20 and 40 years with 25 members in each group: Group I – Control males; Group II – Obese males; Group III – Control females; Group IV – Obese females. Subjects were categorized as obese based on the body mass index and waist-hip ratio. Muscle endurance was tested by performing the handgrip dynamometer test, push-up test, sit-up test, squat test and iron man test.

Results: Significant decrease in the handgrip strength (df 3, F 29), push-ups/min (df 3, F 73), sit-ups/min (df 3, F 70), squat test/min (df 3, F 35) and iron man test in seconds (df 3, 37) were observed in obese males and obese females when compared with respective male and female controls. Moreover, female obese subjects showed a significant decrease in the handgrip strength, push-ups/min and sit-ups/min when compared with the male obese subjects.

Conclusions: Since skeletal muscle is strongly dependent on oxidative phosphorylation for energy production, obesity results in dysregulation of both carbohydrate and fat metabolism. Inactivity appears to be a primary causative factor in the pathogenesis of obesity and decrease in the muscle endurance.

Keywords: Obesity; Muscle endurance; Sedentary.

PP-J-11

Circus Artists as a Valuable Source to Prepare Skilled Athletes

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Background: Do circus artists have better flexibility and agility than the general population? Does reaction time of circus artists differ from that of the general population?

Objectives:

1. To study flexibility and agility in circus artists
2. To determine whole body reaction time of circus artists
3. To compare the results obtained with age- and sex-matched controls
4. To give suggestions, if any

Design: Study was conducted in 30 circus artists (15 males and 15 females) performing various motor skills and in 30 age- and sex-matched controls.

Flexibility was studied by the following tests:

1. Sit and reach test
2. Trunk and neck extension
3. Shoulder rotation
4. Ankle flexion
5. Side to side stretch

Agility was studied by following three tests:

1. Burpees Squat Thrust test
2. Shuttle run test
3. Side step test

Whole body reaction time was determined using whole body reaction time apparatus.

Results: Flexibility, agility and whole body reaction time show statistically significant differences in circus artists as compared to the controls.

Conclusions: Circus artists perform motor skills from a very early age of 4 to 5 years. Hence, they show better values for flexibility and agility. Also, values of whole body reaction time are less as compared to the controls. Therefore, if these children are picked at an younger age and trained properly their inherent capabilities can be developed in a fruitful way. Thus, 'Catch them young' should be our aim.

Keywords: Flexibility; Agility; Reaction time; Circus artists.

PP-J-12
The Measurement of Whole Body Endurance Using the 20-meter Shuttle Test and its Determinants in School Children of Seven to Eleven Years

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Background: There are limited data on physical fitness and whole body endurance in Indian children. Apart from immediate benefits in cognition and metabolic syndrome in childhood, physical fitness also tracks into adulthood and may reduce the risk of cardiovascular disease.

Objective: This study aims to evaluate the gender differences in whole body endurance and aerobic fitness parameters in Indian children.

Design: Three hundred healthy children, 150 boys and 150 girls, between the ages 7 and 11 years were recruited for the study and their anthropometry, lung function, handgrip strength and physical activity were ascertained. The 20-m Shuttle Test was used to determine their whole body endurance. The aerobic fitness was estimated using prediction equations based on the Modified Harvard step test and 20-m Shuttle test. Independent Student's t-test was used to evaluate gender differences in both the whole body endurance and the aerobic fitness. Multiple regression analysis was used to ascertain the determinants of aerobic fitness.

Results: There was a significant difference in the whole body endurance, measured as the total number of shuttles completed in 20-m shuttle test, between boys and girls (boys 52±14 and girls 48±11, $p = 0.01$). Aerobic fitness estimated from both the 20-meter shuttle test and the modified Harvard test did not show a significant gender difference. Fat free mass and age explained 53% of the variance in aerobic capacity in the entire study group.

Conclusions: The present study demonstrated a significant gender difference in whole body endurance, but failed to elucidate a similar difference in aerobic fitness. This may be because aerobic fitness was predicted rather than measured.

Keywords: Whole body endurance; Aerobic fitness; Lung function; Physical activity.

PP-J-13
A Comparative Study of Physical Fitness Index and Predicted Maximum Aerobic Capacity (VO_2max) Among the Srilankan Female Students and Nepali Female Students

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Background: Physical Fitness Index (PFI) is considered an important and valuable parameter in the field of Sports and Exercise Physiology.

Objective: The aim of this study is to assess and compare the physical fitness and cardiorespiratory fitness in terms of maximum aerobic capacity (VO_2max) among the Sri Lankan female students and Nepali female medical students.

Design: Twenty from each of the Sri Lankan as well as Nepali female students of MCOMS (Manipal College of Medical Sciences) were selected by simple random sampling. PFI was determined by Harvard step test and VO_2max was determined by the indirect Queen's College step test (QCT) method for each group of subjects.

Results and Conclusions: From this study, it can be concluded that the Nepali female students have a statistical higher significant value of PFI and VO_2max score than the Sri Lankan female students. Significant correlation was found between age and PFI in both groups of students. PFI score of both groups is positively and highly correlated with VO_2max (QCT).

Keywords: VO_2max; QCT; Physical fitness index; Sri Lankan; Nepali.

PP-J-14

Effect of Yogic Practices on the Physical Health of Young Individuals

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Background: The effects of short-term yogic exercise program on the spinal flexibility in young healthy individuals were measured.

Objective: The objective of the study is to measure the spinal flexibility which is expected to be higher in the yoga group.

Design: Sixty four normal healthy students participated in the study: 35 students formed the control group and 29 students formed the experimental group who had completed 6 months of yoga training by 2 trained yoga teachers. Spinal flexibility was measured in the two groups. Flexion was measured by "stretch test" using a 2-meter scale devised by the YMCA to gauge body flexibility. Back extensibility was tested by making the subject lie in the prone position with the hands folded on the back. Then, they were asked to lift the chest off the floor without any support with the face looking straight forward. The distance from the floor to the chin was noted. Lateral flexion (bending) of the spine was measured in degrees with the help of Leighton flexometer on both the right and the left sides. Observations were analyzed by unpaired t-test.

Results: In the yoga group, there was statistically significant higher spinal flexion both in males and females ($p = 0.002$ in males and 0.006 in females). Also, lateral bending and spine extension (only in female yoga group) was greater but not statistically significant.

Conclusions: Short-term yogic exercise program can cause improvement in spinal flexibility. Regular practice of yoga for a longer duration of time will probably produce significant changes in the body flexibility.

Keywords: Spinal flexibility; Yoga; Flexion; Extension.

PP-J-15

Regular Yoga Exercises and Nitric Oxide

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Background: Nitric Oxide (NO) is an important messenger which signals the surrounding smooth muscle to relax resulting in vasodilatation and increasing blood flow. Yoga is one of the best forms of exercise with many beneficial effects.

Objective: It is hypothesized that long-term regular exercise results in more NO from endothelial cells and also enzymatic conversion of arginine into NO. The objective of this study was to investigate the effects of Pathanjali yoga on basal NO production.

Design: An observational study, 40 subjects who were undergoing yoga training were clinically evaluated and NO levels measured by cadmium reduction method. The subjects were grouped as those who practiced yoga regularly for more than 1 year (Group-I) and those who practiced for less than 1 year (Group-II). The data was compiled and analyzed.

Results: Clinical features such as height, weight, BMI, waist and hip circumference and ratio showed no statistical difference between the groups. However, the only statistically significant difference was the age of the subjects. Group I subjects were aged 48.95±11.83 years and Group II subjects were aged 37.38±13.88 (p value of 0.007**). The FBS levels were (116.40±20.62), (105.19±12.08) mg/dl (p = 0.058+) and the NO was [81.17±38.33], [71.38±37.20] (p =0.428) µmol/l in Group I and II respectively.

Conclusions: In this study, Group I showed higher NO levels despite their higher age proving that long-term practice of yoga promotes higher NO concentration.

Keywords: Nitric oxide; Yoga.

PP-J-16

Study of Important Physical Fitness Parameters in Volleyball Players

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Background: Volleyball is one of the most played games in the world. It is the game of power, agility and speed. However, the level of performance of the Indian volleyball players lags far behind the international standards. Physical fitness is of paramount importance in this game.

Objective: The present study is aimed at finding the role of physical fitness parameters such as strength, muscular endurance, cardio-respiratory endurance and power in volleyball players and to compare these parameters with non-volleyball players. Also, the aim is to compare the findings of the volleyball players with that of the international norms from the available literature and to make some suggestions for the improvement in their performance.

Design: In the present study, 40 male volleyball players of state/national level were taken as subjects. The control group consisted of 40 age-matched non-volleyball players. The strength was assessed using bench press and bench squat, the muscular endurance by push-ups and sit-ups, the cardiorespiratory endurance by estimating VO2max using bicycle ergometer and the power was assessed using vertical jump both in the subjects and the control group.

Results: Almost all parameters included in our study were found to be statistically significant in the subjects when compared with the control group. However, when compared with the international standards, it was found that our subjects were far behind than the recommended norms for the elite volleyball players.

Conclusions: Subjects in our study had more strength, muscular endurance, cardio-respiratory endurance and power as compared to the control group. However, our subjects lag far behind in these parameters when compared with the international standards.

Keywords: Physical fitness parameters; Volleyball players; International standards.

PP-J-17

A Comparative Study of Effect of Isometric Exercise on Intra Ocular Pressure in Obese and Non-Obese Young Adults

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Background: Obesity has positive correlation with intra ocular pressure (IOP) which is the major risk factor for development of glaucoma. Isometric exercise has an IOP-lowering effect after the exercise.

Objective: To compare the effect of isometric exercise on IOP in obese and non-obese young adults.

Design: The study group included 50 students between the ages of 18 and 21 years. Based on body mass index (BMI), subjects were divided into two groups: 25 - Obese (BMI > 25) and 25 non-obese (BMI = 18 to 24.9). Schiotz tonometer was used to measure IOP. Baseline IOP was measured after a relaxation period of 15 minutes in the supine posture. After that, the subjects were asked to do isometric exercise with handgrip dynamometer at 30% maximum voluntary contractions until the point of fatigue. IOP was measured immediately after the exercise. Statistical analysis includes Student's 't'-tests.

Results: The baseline IOP was significantly higher in obese subjects ($p < 0.001$) when compared to non–obese subjects. There was a significant ($p < 0.001$) decline in IOP after the exercise in both the groups, more in non-obese (mean difference of 3.563 mmHg) group compared to the obese group (mean difference of 2.674 mm Hg).

Conclusions: Obesity is characterized by increased sympathetic activity, increase in intra-orbital fat and episcleral venous pressure subsequently reducing aqueous outflow. Isometric exercise which increases sympathetic activity has IOP-lowering effect after the exercise. Hence, the morbidity related to IOP in obese people can be overcome by weight reduction and practicing resistance exercise on a regular basis.

Keywords: Intra-ocular pressure; Isometric exercise; Obesity; Sympathetic activity.

PP-J-18

Corelation of Handgrip Strength, Handgrip Endurance With Body Weight and Lean Body Mass in Young Male Wrestlers

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Background: It is widely accepted that handgrip strength measurements provide an objective index of the functional integrity of the upper extremity. Handgrip strength, a simple index of skeletal muscle function and a functional index of nutritional status, is influenced by effort, skeletal muscle bulk and contractility.

Objective: The present study was done to find out correlation between the handgrip strength with body weight and fat-free mass among male wrestlers in the age group of 11 to 25 years so that their physical performance can be improved further.

Design: Sixty young male wrestlers were divided into 3 groups depending on their age. Group I consisted of wrestlers in the age group of 11 to 15 years [n = 22], group II in the age group of 16 to 20 years [n = 22] and group III in the age group of 21 to 25 years [n = 16]. Karl Pearson's co-efficient of correlation was used to correlate mean handgrip strength, handgrip endurance with increase in body weight and lean body mass.

Results: There was a significant correlation of handgrip strength with bodyweight [0.71, $p < 0.05$] and lean body mass [0.70, $p < 0.05$]. Handgrip endurance also showed significant correlation with bodyweight [0.37, $p < 0.05$] and lean body mass [0.37, $p < 0.05$].

Conclusions: Evaluation of body composition is of valuable contribution to coaches and health personnel. A regular assessment of soft tissue composition in wrestlers is needed to set realistic weight goals and to select weight class most appropriate to athlete stature and physique.

Keywords: Handgrip strength; Lean body mass; Wrestler.

PP-J-19

A Study of VO2max and Plasma Lactate Values in Football Players

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Background: Study was conducted to determine VO_2max and plasma lactate values of football players. Football is the most popular sport played all over world. There is scarce published data on football players from India, although there are numerous published reports for American, European and Australian players.

Objective: To evaluate aerobic capacity (VO_2max) and anaerobic capacity (lactate) in professional football players and compare it with controls.

Design: Sixty males, aged 21 to 24 years, were included in the study: 30 were professional football players and 30 were controls with sedentary lifestyle. Queens College Step Test was used to determine predicted VO_2max. An all-out effort of running for 60 seconds was performed by both groups and immediately after that venous sample was collected for plasma lactate estimation. Unpaired t-test was used to test statistical significance.

Results: Mean predicted VO_2max was 59.53±2.96 ml/kg/min in players and 42.61±3.45 ml/kg/min in controls, mean plasma lactate 104.03±9.55 mg/dl in players and 65.13±7.6 mg/dl in controls. The difference in VO_2max and lactate is statistically highly significant with 'p' value less than 0.001.

Conclusions: Thus, football players showed superior aerobic and anaerobic capacity. VO_2max of local professional players fall in the range reported for elite soccer players from various countries. The coaches may get help in improving performance of players by proper designing of training programs in accordance with research studies. Maybe, this will contribute in putting India ahead in international soccer rankings.

Keywords: VO_2max plasma; Lactate; Football players.

PP-J-20

Cardiopulmonary Fitness in Residential and Non-residential School Children

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Background: During adolescence period, the growth and physical fitness is not only affected by hormones and genetics but also by proper diet and regular exercise. This hypothesis is confirmed by our study.

Objective: To study and compare maximal aerobic power (VO_2max) and Physical Fitness Index (PFI) in Residential and Non-Residential school children.

Design: The present study was designed on healthy school children of Residential Sainik (100) school and Non-Residential (100) school (between the ages of 12 and 16 years) in Bijapur. The aim of the study is to evaluate VO_2max (ml/kg/min) and PFI (%). The VO_2max and PFI were determined by the Harvard Step Test.

Results: Statistical analysis was done by Z test. The VO_2max (Mean ± SD) in residential is 66.03 + 7.06 and in the non-residential school children is 55.24 + 7.53; PFI (Mean ± SD) in residential is 54.96 + 8.38 and in non-residential school children is 44.75 + 5.05. The VO_2max ($p = 0.000$, i.e, z value is 10.44) and PFI ($p = 0.000$, i.e, z value is 10.44) were very significantly high in residential compared to non-residential school children.

Conclusions: It is possible that routine physical exercise and proper food supplementation attribute to better cardiopulmonary fitness in growing children.

Keywords: Residential school children; Non-residential school children; VO_2max; Physical Fitness Index.

PP-J-21

Influence of Postural and Psychosocial Stresses on Work-Related Musculoskeletal Disorders and Discomfort Rating Among China Clay Mine Workers

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Background: Work-related musculoskeletal disorders (WRMSDs) and body discomfort at different body segments have multifactorial etiology. Literature review suggests that gradual onset of WRMSDs and discomfort levels are linked with awkward postures and work-related psychosocial risk factors.

Objective: To find possible correlation of WRMSDs and discomfort level with postural and psychosocial stresses of china clay mine workers during performing mine tasks.

Design: The study was carried out on 180 male china clay mine workers (between the age of 25 and 35 years) of different china clay mines of Birbhum district in West Bengal, India. WRMSDs and psychosocial risk factors were evaluated by modified Nordic questionnaires. Discomfort rating was measured by a 10-point subjective scale. The postural stresses were studied by Ovako Working posture Analysis System (OWAS) employing video-photography.

Results: High prevalence of WRMSDs and severe discomfort rating (>6) was observed in several body segments of the china clay mine workers. The results of OWAS revealed that the work posture adopted during performing china clay mine tasks was distinctly harmful (action category 3) and the risk of MSD was significant. Analysis of psychosocial scores showed that the major percentage of workers was affected by psychosocial stresses. WRMSDs and discomfort rating was found to be associated with the intensity of psychosocial stresses.

Conclusions: Along with physical and environmental stressors, postural and psychosocial stressors also have some contribution for occurrence of WRMSDs and body discomfort among the china clay mine workers.

Keywords: Work-related musculoskeletal disorders (WRMSD); Discomfort rating; Postural and psychosocial stress; China clay mine.

PP-J-22
VO_2 max in Young Healthy Indian Adults

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BACK GROUND: VO_2max is the maximum amount of oxygen a person can intake and the value does not change despite the increase in workload over time period. In spite of its utility, there is lack of data in Indian population and studies which have looked at the association with factors which could affect VO_2max measurement.

OBJECTIVE: (i) to assess VO_2max in healthy young Indian adults (ii) to assess the strength of association between VO_2max, cardio respiratory parameters, body composition and physical activity levels (PAL) (iii) to compare assessed VO_2max with predicted VO_2max in healthy Indian adults

METHODS: 20 young adult males underwent detailed clinical evaluation, anthropometry and physical activity level evaluation. Following cannulation and instrumentation each subject underwent the modified Bruce protocol for VO_2max assessment. Breath by breath VO_2, and VCO_2, Oxygen Saturation, heart rate, blood pressure were evaluated throughout and post exercise. Blood lactate levels were evaluated following the exercise protocol for 30 minutes.

RESULTS: There was an internal validity of the estimated VO_2max with maximum heart rate ($r= 0.516$, $P<0.05$). Respiratory rate and tidal volume significantly correlated with VO_2max. Linear regression analysis indicated PAL as a strong predictor of VO_2max. Predicted equation [(0.018x weight) +1.212] had the maximum association with the measured VO_2max ($r=0.88$, $P<0.05$). Estimation of lactate indicated a significant peak value at the 2nd minute during post exercise.

CONCLUSIONS: This study estimated for the first time VO_2max and compared it with factors affecting it in an Indian population. Physical activity emerged as a strong predictor of VO_2max and comparison of predicted VO_2max equations demonstrated wide range of bias.

FC-K-01

Ergonomics of Ocular Stress and Ocular Surface Imaging Amongst Watchmakers/Repairers of Kolkata and its Possible Preventive Measure

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Background: Watchmakers representing laborers of unorganized sector are suffering from eyestrain/ailments of various kinds. Its detailed understandings is the central theme of the study.

Objective: The study aims at the ergonomic risk assessment in terms of visual abnormalities, clinical correlations between human-machine interfaces and quantifying the damage in terms of newer parameter.

Design: Twenty (20) male laborers were arbitrarily taken from Kolkata with an age range of 40 to 50 years for this double blind study. Ten watchmakers and ten sedentary workers were assessed. The visual parameters such as visual pain, near point convergence, positive fusional vergence, adduction and abduction of eye, intra-ocular pressure, visual acuity, retinal vasculature and capillaroscopy were performed by standardized protocol and digital angiography technique including fundus photography respectively. A special eye dominance test was also done during development of PPE. All data were processed using statistical software Minitab 15 for Windows, version 2009.

Results: Hidden ocular stress was identified. The occupational visual damages in terms of visual analog scale rating, the RAF scale study for NPC, adduction of eye and visual acuity between two groups showed significant differences. Most of the watchmakers are found to be right eye dominant.

Conclusions: Visual breaks are mostly recommended. The ergonomically designed eyegear and workstation/ table are specifically recommended for the particular job of watch-repairing.

Keywords: Retinal capillaroscopy; NPC; Ocular stress; Risk assessment.

FC-K-02

Prevalence of Work-related Musculoskeletal Disorders Among Sewing Machine Operators in Garment Factories in Sri Lanka

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Background: Despite a widespread garment industry in Sri Lanka, there are no studies on musculoskeletal disorders (WMSDs) among sewing machine operators (SMOs).

Objective: To determine the prevalence of WMSDs and risk factors associated with WMSDs among SMOs.

Design: Two hundred and fourteen SMOs were randomly selected from two garment factories and interviewed using a pre-tested questionnaire to determine WMSDs in the past year. Chi-square tests and logistic regression analyses were performed to ascertain associations.

Results: Sixteen percent of SMOs had at least one WMSD. Lower back pain was the most common WMSD occurring in 31% of the SMOs. The prevalence of other WMSDs included pain in the shoulder (23%), neck (19%), knee (17%), wrist and arm (10%) and elbow (9%). Time pressure to finish the task was significantly associated with lower back pain (OR =

2.18, 95% CI = 1.17-4.07) and neck pain (OR = 2.85, 95% CI = 1.28-6.334). Poor job satisfaction was significantly associated with knee pain (OR = 5.05, 95% CI = 1.20-21.22) and shoulder pain (OR = 5.963, 95% CI = 1.37-25.9). Neck pain was significantly associated with job insecurity (OR = 2.60, 95% CI = 1.27-5.29).

Conclusions: This study shows that predominant ergonomic problems among SMOs are lower back pain followed by pain in shoulder area and the knee. Measures to increase job satisfaction and job security among workers need to be initiated.

Keywords: Sewing machine operators; Musculoskeletal disorders; Ergonomic.

FC-K-03

2D:4D Ratio in Predicting Aggression Amongst School Children in Kolkata

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Background: Recent research has focused on the ratio of the lengths of the second to fourth manual digits (2D:4D) as a predictor of the degree of expression of sexually dimorphic traits and aggression. In the present study, we reassessed the relationships amongst school children of Kolkata. Men had a lower 2D:4D ratio than that of women, confirming the typical sex difference in digit proportions.

Objectives: The current study was undertaken to find out the correlation between 2D:4D ratio, primary growth spurt, sex difference, factuality asymmetry, aggressive nature and cognitive skill of early school children.

Design: Forty six male and 8 female students of primary classes in Kolkota in the age group ranging from 7 to 11 years were randomly taken for this double blind study. Subjects were classified into three groups with respect to age ranges. In addition to standard body dimension, other specially characterized factors such as 2D:4D ratio, palm length (cm), palm breadth (cm), palm thickness(cm), head circumference (cm) and handgrip strength were assessed. Serum testosterone levels were assessed by standardized chemiluminescence's method. A novel Questionnaires Method (Buss and Perry aggression questionnaires) was also employed. Statistical analysis was performed using modified statistical software minitab-15 for windows version 2009. The 2D:4D ratio and fluctuating asymmetry (FA) have been correlated with spatial and verbal ability as well as aggression.

Results: Results indicate that aggression starts amongst children with the onset of primary growth spurt, i.e., around the age of 7 to 9 years. Girls below 9 years possess higher 2D:4D ratio than that of their counter parts.

Conclusions: In the current study, it was hypothesized that males with low 2D:4D ratio, higher aggression and higher spatial ability are due to organizational effects of testosterone during development.

Keywords: 2D:4D ratio; Aggression; School children.

PP-K-04

Implementation of Ergonomic Intervention: A Systemic Approach on Hand Muscle Fatigue and Productivity of Carpenters

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Background: A proficient craftsman performing carpentry using a wide range of wood and carpentry tools is called as a carpenter. To carry out specific carpentry job, carpentry tools (such as a handsaw) are widely used on a large scale.

Objective: The objective of this study was to assess the effect of ergonomic intervention on hand muscle fatigue and productivity of the carpenters.

Design: For this current study, 100 male carpenters were selected from the Kolkata District of West Bengal. The study included questionnaire study, posture analysis, physiological stress measurement and electromyography. A new ergonomic intervention was introduced to the carpenters with their active suggestions.

Results: Analysis of postures by RULA indicated that most of the postures adopted at work with existing handle are awkward and non-linear in nature. As a result, they most often suffer from various types of musculoskeletal disorders particularly affecting the wrist, arms and shoulder regions. To overcome such problems, modified handles of handsaw have been designed as M1 to M9. By the EMG study, it was observed that M7 and M8 are the most effective handles because it shows less RMS (less muscle fatigue and lesser power needed) and high MDF (less muscle fatigue and work can continue at high frequency).

Conclusions: It can be concluded from this study that M7 and M8 can reduce the fatigue of hand muscles and can improve the carpenters health during work which can be treated as the increment of productivity.

Keywords: MSD Intervention; Handsaw; Productivity.

PP-K-05

Effect of Gradient and Load on Cardiorespiratory Responses in Indian Soldiers During Carrying Load at Two Walking Speeds

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Background: Manual load-carrying by Indian soldiers is often necessary in the remote planes, countryside and mountain areas of India. The great interest of military researchers is to establish how well soldiers can perform their prime functions during and after load-carrying. Overloading of soldiers with ammunitions and equipments can lead to excessive fatigue and impair the soldier's ability to fight.

Objective: The present study was undertaken to find out the effects of gradient and load on the cardiorespiratory responses of Indian soldiers while carrying loads at different walking speeds.

Methods: Ten physically fit infantry soldiers of the Indian Army with their mean±SD age 23.2±2.62 years, height 172.6±3.81 cm, weight 65.9±7.09 kg and VO_2max 47.5±4.44 $ml.min^{-1}.Kg^{-1}$ volunteered for the study. Each subject underwent forty (40) experiments while carrying no load and with carrying of loads 4.4 kg, 10.7 kg, 17.0 kg and 21.4 kg at the speed of 3.5 and 4.5 $km.hr^{-1}$ and at 0%, 5%, 10% and 15% gradient on treadmill for 10 minutes' duration. Heart rate (HR), minute ventilation (VE), oxygen consumption (VO_2) and energy expenditure (EE) of each of the individual were determined by breath-by-breath gas exchange analysis using K4b2 system (Cosmed Inc., Italy). Average of the last 3 minutes data of each parameter of exercise trial were considered as an individual value and subjected to statistical treatment. One-way analysis of variance (ANOVA) was carried out.

Results: A gradual increase in the mean HR, VE, VO_2 and EE with increasing load magnitude in comparison to unloaded walking was observed. These increases were consistent with the increase in gradients at both the walking speed of 3.5 km/hr and 4.5 km/hr. It was also noticed that all the cardiorespiratory parameters showed maximum increase during carrying highest magnitude of load (21.4 kg) at both the walking speeds in all gradients (0%, 5%, 10% and 15%).

Conclusions: Findings of the present study suggests optimal loads for carriage by male Indian soldiers to maintain their effective combat readiness in different gradient and walking speed.

Keywords: Gradient; Load; Cardiorespiratory responses; Oxygen consumption; Workload.

PP-K-06

Kinematic and Kinetic Changes of Gait during Carrying Load in Hand While Walking with Different Speeds

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Background: Soldiers carry rifle or light machine gun (LMG) mostly in the right hand. This causes partial restriction of the right hand natural arm swing which is known to maintain the centre of mass (COM) of the body.

Objective: The present study evaluates the kinematic and kinetic changes of gait while carrying the rifle or the LMG in the right hand during walking at two different speeds in the same and contra lateral side respectively.

Design: Kinematic and kinetic responses of ten healthy male Indian infantry soldiers with mean (SD) age of 23.3 (2.6) years, height 172.0 (3.8) cm and weight 64.3 (7.4) kg were recorded while they walked with no load (NL) and with the rifle (4.2 kg) or the LMG (6.8 kg) in right hand at self-selected comfortable walking speed (0.97 m.sec-1) and fast walking speed (1.79 m.sec-1). Kinematic data was collected using six cameras based 3D Motion Analysis System and Ground reaction force (GRF) components were recorded using two force plates. Spatial, temporal parameters and joint angular changes and the ranges of motion (ROM) for complete gait cycle in sagittal plane for ankle, knee, hip, pelvis, trunk, shoulder and elbow joints were recorded. Vertical, anteroposterior and mediolateral GRF components were recorded for the same load conditions at comfortable slow speed only.

Result: Kinematic and GRF data at slow speed were analyzed separately for the right and the left sides and the data for NL was compared with the rifle and the LMG in each side. The load conditions of the right side were than compared with corresponding load conditions in the left side. The kinematic parameters of each load condition in the right side for slow speed were also compared with corresponding load conditions for the right side at fast speed. All the comparisons were done using one-way analysis of variance (ANOVA) and wherever applicable, Dunnett post-hoc test was administered. Trunk forward lean angles showed significant changes in all conditions. Vertical and anteroposterior GRF significantly increased while carrying loads in hand.

Conclusions: Significant increases in vertical and anteroposterior GRF along with increased forward leaning of trunk indicated that the partial restriction in natural arm swing of hand may possibly influence the excursion of COM and may increase the musculoskeletal stress even at smaller load increments. Possible injury potential of one-hand rifle or LMG carriage in the long run is not known.

Keywords: Hand carriage; Kinematics; Kinetics.

FC-L-01

A comparative Study of Psychological Parameters in Migraneurs on Drug Therapy and on Electro Acupuncture

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Background: Behavioral, psychological and cognitive-affective mechanisms have been found to be involved in migraine. However, there is limited data available comparing the electro acupuncture therapy and the drug therapy in migraneurs based upon quality-of-life parameters.

Objective: To compare psychological parameters in two groups of migraneurs: A) on the electro acupuncture and B) on the drug therapy.

Design: The study was conducted on 60 migraneurs of both the genders in the age group of 30 to 50 years. They were randomly assigned in 2 groups of 30 patients each: Group A underwent electro acupuncture therapy for 8 to 10 sittings of 45 mins each over a period of 30 days. Group B received drug therapy comprising of Tab Flunarizine (calcium channel blocker) 20 mg once daily and Tab Paracetamol 500 mg SOS for 30 days. The subjects were asked to fill the WHO Quality of Life BREF and MIDAS (Migraine Disability Assessment) questionnaire pre- and posttherapy. The data was statistically analyzed using the Tukey test.

Results: In comparison to the drug therapy, migraneurs on the acupuncture therapy had a better scoring with WHOQOL-BREF questionnaire ($p = 0.000$ to 0.005) and their MIDAS grades ($p = 0.000$) were also lower.

Conclusions: Based on WHOQOL-BREF and MIDAS grades, it was seen that electro acupuncture therapy results in better improvement in the quality of life as well as the disability grades as compared to the drug therapy.

Keywords: Migraine; Quality of life; Electro acupuncture; Drug therapy.

FC-L-02

Cetirizine Produces Electroencephalographic Changes

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Background: The effect of cetirizine on electroencephalogram (EEG) is controversial. Some studies with its 20-mg cetirizine single dose reported no EEG effects whereas some other even with 10 mg reported the effects.

Objective: To study the effect of 15-mg single-dose cetirizine on EEG.

Method: A cross-over, placebo-controlled, double-blind study was conducted on 30 consenting healthy male volunteers (age range 22 to 33 years). A 5-min EEG was recorded at baseline and with placebo and cetirizine. The EEG was decomposed into its constituent frequencies: slow (0.5 - 6.5 Hz), extended alpha: alpha1 (6.5 - 8 Hz), alpha2 (8.5 - 10 Hz), alpha3 (10.5 - 12 Hz), alpha4 (12.5 - 14 Hz) and beta (14.5 - 32 Hz). The three EEG data sets (baseline, placebo and cetirizine) were compared.

Results: Cetirizine increased EEG slow activity power at Cz [$p = 0.021$], Pz [$p = 0.008$] and C3 [$p = 0.004$]. It decreased beta activity power at T5 [$p = 0.020$] and O1 [$p = 0.043$] and alpha2 activity at O2 [$p = 0.041$] in comparison to the baseline. Nine subjects reported symptoms of drowsiness with cetirizine. In them, power of EEG extended alpha, beta, alpha2 and alpha3 decreased whereas in asymptomatics ($n = 21$), power of EEG slow and alpha1 increased.

Conclusions: Single dose of 15-mg cetirizine produces EEG changes regardless of reported symptoms of drowsiness.

Keywords: Cetirizine; EEG; Drowsiness.

FC-L-03

Renoprotective Effect of Terminalia Arjuna Extract on Acetaminophen-induced Uremic and Renal Failure Albino Male Rats

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Background: Terminalia arjuna (TA) are highly valued in the treatment of various human diseases including

renal diseases in many countries. In this present study, bark extract of TA was studied on the alteration of acetaminophen-induced uremic rats.

Objective: The present study is aimed at investigating the effects of methanol extract of medicinal plant TA on the antioxidant defense system and uremia on uremic rats.

Design: The study was conducted on 3 groups (each group containing 6 rats) of healthy adult male Wister strain rats having a body weight of 108±3 gm. Group 1 was supplied normal food and water ad libitum. Group 2 and Group 3 were administered acetaminophen, the most effective chemotherapeutic analgesic-antipyretic agents belonging to the para-aminophenol class of non-steroidal anti-inflammatory drugs (NSAIDs), 400mg/kg body weight/rat/day in 0.5 ml normal saline intraperitoneally for 15 days of experimentation. Group 3 were administered methanol extract at the dose of 400 mg/kg body weight/day/rat in 0.5 ml deionized water through gavage.

Results: Urea and creatinine levels increased in the blood and kidneys in Group 2 and significantly decreased in Group 1 and 3. Catalase and superoxide dismutase activities in the plasma and the kidneys were significant diminutions in Group 2 (uremic animals) compared to Group 1 and 3 animals. Quantity of melon–di-aldehyde and conjugated dienes increased in the blood and the kidneys in Group 2 and significantly decreased in Group 1 and 3.

Conclusions: We could conclude that correction and protection of the oxidative stress and uremia of acetaminophen-induced uremic animals have been found by applying the methanol bark extract of T. arjuna.

Keywords: Terminalia arjuna; Uremia; Antioxidant; Acetaminophen; Renal disease.

FC-L-04

Hypolipedemic Effects of Cynodon Dactylon Extract in Wistar Rats Fed on High-Cholesterol Diet

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Background: Cynodon dactylon has many medicinal properties including antimicrobial, antiviral, anti-inflammatory and antioxidant properties. Decreasing the prevalence of hyperlipidemic conditions is considered to be an important therapeutic approach. The hypolipidemic property of cynodon dactylon has not been explored.

Objective: To investigate the potential role of alcoholic extract of cynodon dactylon in lowering the plasma lipid parameters.

Design: Alcoholic extract of Cynodon dactylon plant was administered orally in a dose of 400 $mgKg^{-1}$ of experimental animals for 45 days. Animals were divided into four groups of six rats each.

Group I: Normal rats administrated with normal saline (0.5ml)

Group II: Normal control rats administered with cynodon dactylon ethanolic extract

Group III: Hypercholestremia-induced rats

Group IV: Hypercholestremic rats administered with cynodon dactylon extract

Results: Serum total cholesterol, LDL cholesterol, VLDL cholesterol and triglycerides levels increased significantly ($p < 0.001$) after 45 days of cholesterol feeding. The total cholesterol to HDL cholesterol ratio were also increased significantly ($p < 0.001$). Concurrent administration of cynodon dactylon extract

with cholesterol caused a significant decrease ($p < 0.001$) in the levels of serum total cholesterol, LDL cholesterol, HDL cholesterol, VLDL cholesterol and triglycerides when compared with cholesterol-fed control rats. The ratios of total cholesterol to HDL cholesterol were also declined significantly ($p < 0.001$) as compared to cholesterol-fed control rats. These results suggest the lipid-lowering effects of cynodon dactylon.

Conclusions: This may explain the efficacy of cynodon dactylon in the management of cardiovascular diseases and probably serve as a new potential natural product for the treatment of hyperlipidemia.

Keywords: Cynodon dactylon; Cardiovascular disease; Hyperlipidemia; Cholesterol; HDL; LDL; VLDL; triglycerides.

FC-L-05

Rat *in Vivo* Experiments to Demonstrate the Effects of Cleistanthin B

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Background: Cleistanthus collinus is a poisonous shrub belonging to the family Euphorbiaceae. Mortality associated with this poisoning is 28 % (Kurien T et al. 1987).

Objective: To study the clinical picture in rats following the administration of Cleistanthin B-enriched fraction.

Design: Two sets of experiments were done with two types of Cleistanthin B-enriched fractions (Cleistanthin B obtained from column chromatography -'column Clei B' and from liquid-liquid partition chromatography - 'LLP Clei B'). Rats were anaesthetized with ketamine and the carotid or the femoral artery was cannulated. The toxin or the control solution was injected intraperitoneally into the rats and the blood samples were taken for arterial blood gas measurements and the urine samples for pH measurements. ECG, respiration and BP were monitored. The animals were monitored continuously till death or for a period of 7 to 8 hours after which they were sacrificed.

Results: Mortality is significantly high in the tests as compared to the controls. Acidosis had developed in both the test and the control groups. With the 'column Clei B' fraction, there was hypercarbia and hypokalemia in the tests. In 'LLP Clei B' test and control groups, there was a reduction of bicarbonate and PCO2 levels. Urine pH remained acidic in both tests and controls.

Conclusions: Cleistanthin B-enriched fraction is toxic to rats at a dose of 2-7 mg/100 gm body weight. The cause of death with both Cleistanthin B-enriched fractions is more likely a respiratory event. Two features of DRTA (hypokalemia and acidosis) are seen with 'column Clei B' and not with 'LLP Clei B'.

Keywords: Cleistanthus collinus; Cleistanthin B; DRTA; Type; Column chromatography; Liquid-liquid partition chromatography.

FC-L-06

Diphyllin is a Non-Toxic Component of the Toxic Plant Cleistanthus Collinus

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Background: Cleistanthus collinus, Oduvanthalai in Tamil, is a poisonous shrub. The boiled extract of the leaves is consumed for suicide. Mortality rate is around 30% and usually occurs on the 3rd day (Thomas et al. 1987). Patients usually have the triad of metabolic acidosis, hypokalemia and alkaline urine, the feature of type 1 DRTA (Benjamin et al. 2006). This picture is also shown in rat models (Maneksh et al. 2010). The

primary toxins in the leaf are Cleistanthins A and B, diphyllin and collinusin (Prabhakaran C et al, 1996).

Objective: To inject diphyllin extracted from Cleistanthus collinus into anaesthetized rats and make serial measurements of blood gas parameters, urine pH, ECG, blood pressure and respiration till the animal dies spontaneously or up to 8 hours.

Design: Diphyllin was isolated from the aqueous extract of the plant using TLC followed by freeze drying. The diphyllin was administered to the rats intraperitoneally. Femoral artery was cannulated. Samples were withdrawn at 0, 1, 2, 4, 6 and 8 hours and analyzed. ECG, respiration and blood pressure were acquired and recorded on a computer. Urine pH was measured. Control experiments were done by injecting water intraperitoneally. Analysis was done using CMC DAQ, Igor Pro and SPSS softwares.

Results: The mortality in diphyllin (n = 6) and control (n = 5) groups were 16.66% and 20% respectively. Both the groups developed metabolic acidosis with respiratory compensation. There was no significant difference between the groups.

Conclusions: Diphyllin obtained from the toxic plant Cleistanthus collinus is not the cause of type 1 DRTA. DIPHYLLIN IS NON-TOXIC.

Keywords: Diphyllin; Cleistanthus collinus; DRTA.

PP-L-07
Alteration of Chemical Behavior of Nickel Sulfate in Combination with L-Ascorbic Acid at Different pH Solutions In vitro

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Background: Nickel, a known free radical generator heavy metal, induces oxidative stress and depletes antioxidant vitamin L- ascorbic acid *in vivo*.

Objective: The purpose of this study is to evaluate alteration of chemical behavior of L-ascorbic acid with nickel at different pH solutions in vitro.

Design: Spectrum of L-ascorbic acid and nickel at various pH (2.0, 7.0, 7.4 and 8.6) at room temperature of 29°C were recorded. In this special spectral analysis, combined solution of nickel sulfate and L-Ascorbic acid at different pH were also recorded.

Results: The result reveals that ëmax (peak wavelength of spectra) of L-ascorbic acid at pH 2.0 is 289.0 nm whereas at pH 7.0, pH 8.6 and at pH 7.4, the ëmax remained same at 295.4 nm. The ëmax of nickel solution at pH 2.0, pH 7.0 and pH 7.4 are 394.5 nm. However, at alkaline pH 8.6, ëmax became 392.0 nm. The combined solution of L-ascorbic acid and nickel sulfate (6mg/ml each) at pH 2.0 shows 292.5 nm and 392.5 nm respectively. Whereas at pH 7.0, L-ascorbic acid shows 296.5nm and nickel sulfate shows 391.5nm. At pH 7.4, L-ascorbic acid shows 297.0 and nickel sulfate shows 394.0 nm. At pH 8.6, L-ascorbic acid and nickel sulfate are showing 297.0 nm and 393.5 nm respectively.

Conclusions: Probably oxidation of L-ascorbic acid to L-dehydro ascorbic acid via the free radical (HASc) from the reaction of H2ASc + Ni (II) is the reason for behavioral changes at different pH status.

Keywords: pH; Spectrum; L-ascorbic acid; Nickel.

PP-L-08
A Case Report of Phenytoin and Carbamazepine Cross-reactivity

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Background: Phenytoin, phenobarbitone and carbamazepine are the first-line drugs for treatment of convulsions. The maculopapular rashes with these aromatic anticonvulsants account for greater than 5% of cases. Overlap of hypersensitivity to these drugs has been described. We report the cross-reactivity between phenytoin and carbamazepine.

Objective: Nil.

Design: Case report: A 63-year-old male suffering from generalized seizures was prescribed phenytoin 300 mg daily. He developed generalized maculopapular rashes on the 15th day of therapy. It was mild and subsided with antihistamines. Phenytoin was discontinued and carbamazepine 600 mg daily in divided doses was prescribed. On the 20th day of carbamazepine therapy, the patient developed rashes and they subsided after symptomatic therapy. He continued to take carbamazepine and after 8 days, he had fever for which he took cefpodoxime and paracetamol. After 2 hours, he developed generalized maculopapular eruptions with ulcers in the oral cavity and lips. The anticonvulsant was stopped and he responded to symptomatic treatment.

Results: Approximately 70 to 75% of patients manifesting with maculopapular eruptions to one aromatic anticonvulsant show cross-reactivity to the other. Cross reactivity does not always occur when one drug is switched over to the other, but in our patient, he developed a cross-reaction. The epoxides of phenytoin could have sensitized the immune system and thus produced an immune response.

Conclusions: When the hypersensitivity to aromatic anticonvulsants is suspected, the offending drug should be discontinued and supportive therapy has to be provided. The convulsions are to be managed with valproate.

PP-L-09

Analysis of Emotional Reactivity and Hippocampal Morphology in Arsenic-exposed Rats

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Background: Arsenic affects nearly all organ systems of animals including humans. However, reports on the effects of arsenic as a drinking water contaminant on cognitive performances are scanty.

Objective: We investigated the effects of arsenic exposure on neurobehavioral performances and hippocampal morphology in adolescent rats.

Design: Male Wistar rats were assigned into three groups. Group I: Normal control group - these animals remained in the home cage throughout the experimental period. Group II: Vehicle control group - these animals were administered with isotonic sodium chloride solution orally for 21 days. Group III: Arsenic-exposed group - these animals were administered with aqueous solution of sodium arsenite (NaAsO2; 10 mg/kg b.wt) orally for 21 days. After the experimental period, all animals were tested for behavioural performances and then sacrificed to study the morphology of hippocampus. Statistical analysis was done by using ANOVA followed by Tukey's test. P value < 0.05 was considered to be statistically significant.

Results: Elevated plus maze test - Open arm exploration time was less in arsenic exposed rats compared to other groups. Passive avoidance test - Arsenic-exposed rats showed greater entrance latency to enter dark compartment during the exploration trials and this indicates learning impairments. They also took less time to enter the dark compartment and spent more time in the dark compartment during memory retention test. Hippocampal morphology - The hippocampal regions of these animals showed many shrunken, darkly stained neurons and these changes were absent in control rats.

Conclusions: Arsenic exposure altered the neurobehavioral performances and hippocampal morphology in rats.

Keywords: Arsenic; Emotional reactivity; Memory; Hippocampus.

FC-M-01

Carbon Sequestration in Nature: A Novel Concept in Bioremediation within Microbe-Human Interface

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Background: The Sundarban Delta and its inhabitants are under serious stressful conditions of multiple natures: both environmental and human health-related. This study aims to reduce the CO_2 pollution biologically by using carbon-sequestering, salt–tolerant microorganisms that utilize atmospheric CO_2 and also by removal of excess salt from the soil such that it would be beneficial/ conducive for mangrove plantation. Reduction of atmospheric CO_2 levels would also indicate a progressive betterment of human health.

Objectives: It is known that the microbial contribution to soil carbon storage is directly related to microbial community dynamics and the balance between the formation and degradation of microbial byproducts. Therefore, the objective of the study was to isolate bacteria having the capability of utilizing high concentration of CO_2 and to visualize the probable effect of specific microbial recharging of soil with the isolated anaerobic halophytes in selected areas.

Design: Twelve soil samples and twelve human stool samples were chosen arbitrarily from two areas of Henry Island, namely control and experimental sites, to observe the effect of carbon sequestering bacteria on the growth of mangrove vegetation. Bacteria were isolated from the soil samples on nutrient agar media containing 5% NaCl followed by 5.8% CO_2 incubation for 24 hours. Two different colonies namely yellow and orange were identified and purified. Under similar growth conditions, orange micro colonies were isolated from the human stool samples. All three colonies were grown in broth culture which was poured at the rooting depth of 15 cm of plant in the experimental area only. The chlorophyll content of leaves of mangroves and soil from the experimental and the control sites were analyzed before and after impartment of the broth.

Results: Significant increase in the chlorophyll content within the leaves of mangrove trees, decrease in soil salinity, increment of soil organic matter and soil carbon content in the experimental area were found after impartment of the broth indicating the potential beneficial role of the microbes in the positive soil recharging of carbon. Comparable results were obtained with bacteria, isolated from stool as well.

Keywords: Carbon Sequestration; Halophytic Microbes; Bioremediation.

FC-M-02

Effect of Garlic (Allium Sativum) on Antioxidant Defense System in Erythrocyte of Albino Rats Exposed to Heavy Metals (Nickel II and Chromium VI)

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Background: Heavy metals are stable and persistent environmental contaminants that cause various alterations in the target tissues after exposure. Garlic has some beneficial effect in preventing nickel- and chromium-induced alteration of serum lipid profile.

Objective: The objective was to investigate the possible protective role of fresh aqueous homogenate of garlic on some hematological parameters, erythrocyte antioxidant defense system in male albino rats treated with nickel sulfate and potassium dichromate.

Design: Adult male albino rats were divided into six groups. Group I were untreated control. Group II

rats were treated with aqueous homogenate of garlic (250 mg/kg b.wt, orally). Group III were administered with nickel sulfate (2.0 mg/100 g b.wt, i.p). Group IV were given nickel sulfate and garlic simultaneously. Group V were administered with potassium dichromate (0.5 mg/100g b.wt, i.p) and Group VI were treated simultaneously with potassium dichromate and garlic. The hematological parameters and erythrocyte antioxidant status were evaluated.

Results: RBC, WBC, platelet count, PCV%, hemoglobin concentration decreased significantly and clotting time increased significantly after nickel treatment. After chromium treatment, all the values decreased except the clotting time. Increased malondialdehyde and decreased glutathione levels after nickel and chromium treatment were observed. Erythrocyte superoxide dismutase, glutathione peroxidase and catalase activities were significantly increased after nickel and chromium treatment. Simultaneous supplementation of garlic exhibited protective role to combat nickel toxicity whereas in case of chromium, no such beneficial effects were observed.

Conclusions: Garlic may partially prevent nickel- and chromium (VI)-induced alteration but such ameliorated effects as an antioxidant was only restricted to the nickel-induced alteration.

Keywords: Garlic; Nickel sulfate; Potassium dichromate; Erythrocyte antioxidants; Lipid peroxide; Glutathione; Superoxide dismutase; Catalase; Glutathione peroxidise.

FC-M-03

Cell Surface Protein Expression of Stem Cells from Human Adipose Tissue at Early Passage

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Background: Research is now being focused on stem cell therapy for repair of diseased and damaged tissues. The ideal source of mesenchymal stem cells (MSCs) is still unclear. An ideal source for MSCs should be one which could be easily accessed, causes minimal patient discomfort and gives a high yield of cells with characteristic cell surface protein expression of MSCs at early passage.

Objective: This study analyzed the cell surface protein expression of human adipose stem cells (ASCs) at early passage with reference to mesenchymal stem cell phenotype and its ability to differentiate into cells of mesodermal origin.

Design/Results: Adipose tissue was obtained as waste material from patients undergoing certain elective surgical procedures after taking consent. Stem cells were isolated and cultured. Flow cytometry analysis of ASCs showed both positive and negative cell surface protein expression, highly characteristic for MSCs as early as passage 0 or passage 1 (early passage). Under appropriate culture conditions, ASCs showed osteogenic differentiation evidenced by presence of calcium phosphate identified by alizarin red staining and adipogenic differentiation evidenced by lipid-rich vacuoles within the cells recognized by oil red O staining.

Conclusions: Cell surface protein expression of human ASCs was highly characteristic of MSCs at very early passage. Since adipose tissue is available in large quantities and has high yield of stem cells, availability of highly characteristic MSCs at early passage will reduce the time for expansion, the costs involved and the risk of cell contamination for stem cell therapy.

Keywords: Stem cell therapy; Mesenchymal stem cells; Cell surface protein expression; Human adipose stem cells; Early passage.

FC-M-04

Temporal Expression of Calcium/ Calmodulin-dependent Adenylyl Cyclase Isoforms in Rat Articular Chondrocytes: RT-PCR and Immunohistochemical Localization

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Background: Many signaling cascades are implicated in the homeostasis of articular chondrocytes. However, the identity of these signaling pathways is not fully established. The 3',5'-cyclic AMP-mediated signaling system is considered to be a prototype. Adenylyl cyclase (AC) is an effector enzyme responsible for the synthesis of cAMP. There are ten mammalian AC isoforms and some of these are differentially regulated by calcium/calmodulin (Ca^{2+}/CaM).

Objectives: Calcium plays an important role in the development and homeostasis of skeletal tissues. Ca^{2+}/CaM-regulated AC isoforms could play a role in the development and maintenance of articular cartilage. This study was designed to evaluate the presence of Ca^{2+}/CaM-regulated AC isoforms in articular chondrocytes.

Methods: Identification of Ca^{2+}/CaM-dependent AC isoforms and their temporal expression in articular chondrocytes in rats was investigated using RT-PCR and immunohistochemistry techniques.

Results: All Ca^{2+}/CaM-dependent AC isoforms were expressed in chondrocytes from all age groups examined. Each isoform was differentially expressed in developing and adult articular chondrocytes. Generally, the expression of AC isoforms was observed to increase with age, but the increase was not uniform for all Ca^{2+}/CaM-dependent AC isoforms.

Conclusions: Expression of Ca^{2+}/CaM-dependent AC isoforms along with other signaling molecules known to be present in articular chondrocytes indicate complicated and multifactorial signaling cascades involved in the development and homeostasis of articular cartilage. Further studies are needed to confirm the role of ACs in the tissue.

Keywords: Calcium/calmodulin; AC isoforms; Articular chondrocytes.

PP-M-05

Chondrocyte Cultures in a Novel Scaffold

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Background: Cartilage repair is a clinical challenge because cartilage lacks the capacity for self-repair. Tissue engineering techniques have now emerged to replace damaged cartilage. While chondrocytes grown in monolayer culture are used for transplantation in humans, currently, it is widely documented that three-dimensional cultures maintain chondrocyte phenotype better.

Objective: To determine whether a scaffold that we have developed preserves chondrocyte phenotype in culture.

Design: Cartilage was harvested from metatarsophalangeal joints of skeletally mature goats, fragmented into 1-mm pieces and subjected to enzymatic digestion. The cells were cultured in a novel scaffold (105 cells per scaffold of diameter 1.5 cm and thickness of 3 mm) for upto 20 days in DMEM. Monolayer culture was done for comparison. Cell morphology was evaluated using light microscopy. Expression of collagen type I and II was studied using immunocytochemistry.

Results: Chondrocytes seeded as single cells multiplied in culture and remained as aggregates till 20th day. Expression of collagen type II was maintained up to the 20th day which indicates that the phenotype of the cell is unchanged.

Keywords: Cartilage; Chondrocyte phenotype; Culture; Scaffold.

PP-M-06

Effect of Mobile Phone Usage on Hearing Threshold

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Background: Mobile phones use electromagnetic radiation in the microwave range, which some believe may be harmful to hearing. Earlier studies have showed an increase in hearing threshold with more than 30 minutes usage of mobile phones per day. Therefore, the present study is designed to investigate a link between the use of mobile phones and hearing.

Objective: To evaluate the relationship between the duration of usage of mobile phones per day and the auditory threshold.

Design: The study includes 50 subjects, age between 15 and 40 years, taken from Sri Devaraj Urs Medical College campus, Kolar. They were divided into two groups based on duration of mobile phone usage. Group1 - Subjects who use mobile phone for more than 30 minutes per day. Group2 – Subjects who use mobile phone for less than 30 minutes per day. Those with history of consumption of ototoxic drugs, recent ear infections, chronic diseases, noise-induced hearing loss (occupational) and smoking were excluded. Pure tone audiometry was done on these subjects in a silent room. Institutional ethical clearance was obtained.

Results: There was a significant increase in the hearing thresholds at all frequencies in air conduction and at 0.25 Hz and 0.5 Hz in bone conduction in those who used mobile phone for more than 30 minutes as compared to those who used it for less than 30 minutes.

Conclusions: There is a significant increase in the hearing threshold in mobile phone users associated with duration of usage. However, the probable cause of hearing impairment cannot be proved by this study and the possible pathophysiology is also not understood and needs to be investigated further.

Keywords: Mobile phones usage.

FC-N-01

Association Between Students' Approach to Learning and Consistency of Their Academic Performance

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Background: Students approach learning in three distinct ways - deep approach (understand and relate material learnt), strategic (achieving) and superficial approach (lack of purpose and emphasize ineffective learning). A knowledge of the learning approaches adapted by students and its relation to academic performance will be useful to modify the learning approach to achieve better learning.

Objective: To determine medical students' approaches to learning. To determine the relation between learning approaches of students and consistency in their academic performance.

Design: The Approaches and Study Skills Inventory for Students (ASSIST) 1997 version (Tait et al. 1997) was used to evaluate the learning approaches used by the students. Total scores of the subscales of each approach were adjusted and expressed as percentage. Students obtaining 50% and more marks in all their internal assessments and university exams were considered as consistent academic performers. SPSS version 16 was used for data analysis.

Results: The mean score for deep approach (71.19+/-23.48) was highest compared to strategic (68.7+/-22.35) and surface approaches (54.97+/-20.57). A total of 51 students showed consistency in their academic performance. This group showed statistically significant higher scores in the strategic approach (74.35+/-18) when compared to students whose academic performance was not consistent (65.8+/-23.9). Although the deep approach scores were higher for students who were consistent in their academic performance, it was not statistically significant.

Conclusions: Ideally, students should adapt the deep approach to learning. Students with deep approach to learning may fail to recognize curricular demands and time constraints and consequently may underperform.

Keywords: Learning approaches; Consistent academic performance; ASSIST questionnaire.

FC-N-02

Relationship Between Types of Memory and Learning Style Preferences in The 1st Mbbs Students

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Background: Students have preferences for the way in which they receive information. Their learning styles may be classified according to the sensory modalities by which one prefers to take in information. VARK which is a perceptual instructional preference model categorizes learning preferences as Visual (V), Auditory (A), Reading-Writing (R) or Kinesthetic (K). Many students have a single, strong preference ("unimodal") whereas others have multiple ("multimodal") learning preferences. Short-term memory is an example of how the brain processes information differently when it is either received through visual or auditory stimuli.

Objective: (1) To assess the different learning styles. (2) To associate learning style with visual and auditory memory.

Design: A total of 127 students of 1st year MBBS from Sri Devraj Urs Medical College from Kolar participated in our study. The VARK questionnaire was administered to the students to assess their learning styles. Later, visual and auditory memory tests were conducted and learning styles with the type of memory were analyzed.

Results: Our study showed that 79.5% of students preferred the single mode of information presentation out of which 18.1% were visual, 2.51% were auditory, 22.3% were read-write type, and 13.38% were kinesthetic type of learners. It was observed that auditory memory was better than visual memory in all the types of learners.

Conclusions: Whatever may be the preference of learning style, auditory memory was dominant. This indicates that lectures still play an important role in teaching as a learning method.

Keywords: Learning styles; Memory types; Visual; Auditory.

PP-N-03

Adult Learning Principles: Accepting the Learning Style Differences Among UG Students

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An effective teaching aims at student learning. Does it happen always? How frequently do we think over it? Teaching has two major aspects: content and process. Teaching process (instructional method) is extremely important for learning. Learning in adults differs from those in children. Understanding how adults learn is a prerequisite to instructional method selection. Adult learners are leaders of their own learning. They have rich life experiences and knowledge. They are goal and relevancy oriented. They are practical and like to be respected. While facilitating student learning, our teaching could be graded that it moves from more to less structure and from less to more responsibility. It demands the teacher to develop rapport with the students, show interest in their thoughts and opinions, lead the student toward inquiry, provide regular constructive and specific feedback, acknowledge their goal accomplishment, encourage resource use and create a non-threatening environment for reflection and

individual learning styles considering their interests and past experiences. Adult students like to be treated with more equality between the teacher and the learner, which is addressed by taking interest in them, acknowledging their wealth of experiences and encouraging expression of ideas/reasoning/feedback. Thus, a teacher should consider students' concerns for effective teaching.

PP-N-04
Stress Handling Potential of Students Admitted Through Different Streams

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Background: Students are admitted to medical course through different streams like CET, COMED and management. They come from different backgrounds having varying stress handling potential. Stress is the consequence of failure to respond appropriately to physical or emotional threat, which is actual or imagined. An individual exposed to stress uses the coping techniques to overcome stress. A prolonged stress without its effective management leads to depression.

Objective: To study the prevalence of depression among first year medical students admitted through different streams.

Design: The Beck Depression Inventory (BDI) was administered to 116 medical students consisting of 54 males and 62 females at the end of their first year course. The BDI has 21 questions with four possible responses to measure intensity, severity and depth of depression. The respondent chooses the most appropriate answer. A total score of 21 and above is an indication of depression.

Results: There were 50 students admitted under CET, 46 and 20 under COMED and management respectively. In the CET group, 9.5% of males and 10% of females had depression. The corresponding values for the COMED group were 13.8% and 29.4% and for the management group, it was 0% and 6.2%. The difference in the depression status among the groups were significant ($p < 0.001$).

Conclusions: (1) Students admitted through COMED had a greater prevalence of depression. (2) Female students were more prone to develop depression. (3) Regular counseling and formal training to handle stress is the need of the hour for medical students.

Keywords: Stress; Coping techniques; Depression; Counseling.

PP-N-05
Influence of Mentoring on Depression Status In First Year Medical Students

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Background: Medical education is a demanding course. Students from different backgrounds find it difficult to cope up with stress. Inability to handle stress results in depression. It becomes imperative to take remedial measures like mentoring to reduce the incidence of depression.

Objective: To study the effect of mentoring on the level of depression among medical students.

Design: The students admitted to first MBBS course during 2009-2010 were recruited for the study. Ten students in each group were assigned to a faculty member below the rank of Professor. Faculty members met each student not less than four times a year as per the standardized format. The activity of the three mentors was supervised by a professor. The students were administered the Beck Depression Inventory within a month of their admission and at the end of

their 1st year course. Students getting scores of 21 and above were considered depressed.

Results: The questionnaire was answered by 138 students (56 males, 82 females) and 143 students (60 males, 83 females). During the 1st month, 17.9% of the males and 12.2% of the females were depressed. The corresponding values for males and females at the end of one year were 8.9% and 15.9% respectively. The change in the depression status in males was statistically significant ($p < 0.05$).

Conclusions: Mentoring had a positive impact on reducing the level of depression in male students. However, it did not have a demonstrable impact among female students. This experience emphasizes the need to modify the mentoring techniques for female students.

Keywords: Depression; Beck Inventory; Mentoring.

PP-N-06

Anxiety Status Assessment of New Entrant 1st Mbbs Students in a City Medical College

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Background: Anxiety is a state characterized by subjective feelings of tension that can vary in intensity with time. Tertiary education has always been stressful. Medical education is a highly achievement-oriented program under a competitive environment.

Objective: This study was conducted to assess the prevalence of anxiety among the newly entered 1st year undergraduate students, to stratify the level of anxiety and the probable cause over a period of twelve weeks.

Design: This study is a cross-sectional study. New entrant first MBBS students of either sex are asked to fill up: (1) State-Trait anxiety questionnaire to measure the anxiety levels along with a set of questions to assess the probable cause of anxiety. (2) GHQ-12 questionnaire to assess the student's current psychological status.

Results: A statistically significant number of students were initially on the moderately anxious scale with regard to books to be read, interpersonal relationships with the opposite sex, seniors and teachers apart from ragging. At the end of 12 weeks, their level of anxiety was persistently high with regard to all the above causes. Fear of failure toward exams was significantly high causing a high degree of stress and sleep disturbance (40%).

Conclusions: Students who had come from different backgrounds to a city medical college were highly anxious. The anxiety score was much higher in those where English was not the medium of instruction during their schooldays. Early identification and appropriate intervention is a must before it could lead to a psychological morbidity.

Keywords: Anxiety; New entrant; Students;

PP-N-07

Effect of Abacus Learning on Memory in School Children

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Background: Abacus is an ancient calculating device used primarily in Asian culture to perform arithmetic processes. In our country, abacus training has become increasingly popular in helping children to perform mathematical calculations. Use of abacus to learn mathematics assists in the formation of declarative memory from procedural memory. Learning is by means of stimulus transmission to another by synaptic plasticity of the brain. The abacus learners try to coordinate visual, auditory and sensory inputs.

Objective: The present study is an attempt to know the effect of abacus learning on visual memory, auditory memory and short-term memory in children.

Design: Subjects included are children who joined the abacus training school. By administering the Binet Kamat Scale, subjects having an average IQ were recruited for the study. A total of 100 children of the age between 7 and 11 years were selected. A battery of Memory Tests, Sentence Repetition Test, Picture Recall Test, Story Recall (immediate), Digit Span Test and Paired Associate Learning were administered to the subjects before and after one and two levels of abacus training.

Results: Comparison between before and after abacus learning showed significance in visual memory ($p = 0.001$), auditory memory ($p = 0.05$) and short-term memory ($p=0.05$).

Conclusions: Abacus training which involves a period of eight months / 32 weeks not only increases the ability of the children to perform mental calculation but also develops memory consistently.

Keywords: Abacus; Memory; Children.

PP-N-08

Sensitizing First Year Medical Students Toward Self-directed Learning (A Simple Intervention for the Indian Scenario)

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Background: In Indian premedical schools, learning is mostly single textbook/ teacher directed. Students entering MBBS feel the need to adapt to a different learning prototype for better understanding of their vast curriculum. In this regard, a simple intervention of setting and evaluating questions by students themselves was tried to sensitize them toward self-directed learning.

Objective: To study the impact of the intervention on understanding the subject and on performance in exams. Analyze student's feedback regarding the intervention.

Design: This study involved 100 first MBBS students attending physiology in Vydehi Medical College. After 10 regular didactic lectures in NMP, weekly sessions were scheduled for 4 weeks in the same chapter. At the start of each session, a question format was announced and all students were instructed to set questions in that format. Questions were distributed randomly, answers evaluated by the question setter (without the aid of books) and those found difficult discussed with the facilitator. Pre and post tests were conducted to assess performance. A validated questionnaire using a 5-point Likert scale (Cronbach's a 0.878) was used for feedback from the students.

Results: The Student's t-test showed a highly significant increase in the mean post test marks ($p <0.001$) when compared to the pretest marks. The percentage of number of students scoring >50% marks in pre and post tests were 14% & 74% respectively. Feedback analysis showed 80% to 90% consensus on improvement in understanding, focusing, time management, performance and realizing difficult/important topics.

Conclusions: Setting and evaluating questions sensitizes students toward self-directed learning.

Keywords: Self-directed learning; Setting; Evaluating questions.

PP-N-09

The Impact of Viva Voce Examination on Student Performance in the Theory Component of the Final Summative Examination in Physiology

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Background: Viva voce examinations formed a part of the theory component of the progress and final

summative examination for the earlier batches. The viva voce marks accounted for 10% of the total marks in theory. Since viva voce examination was administered to all students irrespective of their passing status, the exercise was found to be time consuming.

Objective: This study was conducted to determine the impact of viva voce examination on student performance in the final summative examination.

Design: Three batches of first year medical students were involved in this study. Their theory and viva voce scores of the university examination in physiology were reviewed. The ratio of theory to viva voce scores of the final summative examination was compared between the passed and failed students.

Results: It was found that the mean ratio of theory to viva voce scores was greater than 1 for the passed students and below 1 for the failed students, which were found to be statistically significant.

Conclusions: This indicated that there was no correlation between student performance in viva voce examination and that of theory. However, there was no difference in the mean ratio within the batches according to passing status.

Keywords: Viva voce; Theory; Examination; Student performance.

PP-N-10
Outcomes of Active Learning by Modeling Over Passive Learning in The Medical Profession

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Background: Learning the nervous system has always been a difficult task for the first phase medical undergraduates.

Objective: To assess the outcomes of teaching by active learning by play dough modeling over passive learning.

Design: In this comparative study, fifty students were selected for the control and study groups each. The controls were taught about different sensory and motor tracts using audio-visual aids (passive learning). Immediately after the lecture, they were assessed with a questionnaire and the score noted down. After 15 days and again after 30 days, without any revision of the subject, the same questionnaire was used to assess the retention of the subject. The study group students were analyzed by lecture with audio-visual aids plus making models (active learning) soon after the lecture. Models were made by students using play dough, supervised by teachers. Immediately after this, the students were assessed by the same questionnaire and the score noted down. Again after 15 days and 30 days, without any revision, the students were subjected to the same questionnaire and the score noted.

Results: It was found that there was a highly significant increase in the score after active learning as compared to passive learning. There was also less deterioration in score in the active learning group as compared to the passive learning group, when assessed again after 15 days and 30 days, signifying a better retention of the subject after active learning.

Conclusions: It can thus be concluded that active learning by making models is better than passive learning in teaching the nervous system for students of the medical profession.

Keywords: Active learning; Passive learning; Play dough models; Nervous system.

PP-N-11
Introducing Integrated Practical Examination For Endocrinology And Reproduction Module For Second Year MBBS Class

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Background: Shifa College of Medicine switched to an integrated modular curriculum in the year 2007 and

a horizontally and vertically integrated practical examination (IPE) was carried out in the final exam of Endocrinology and Reproduction Module in the year 2009.

Objective: The objective of this study was to determine that IPE is a better way of assessing the laboratory skills and practical knowledge of the medical students in the preclinical years.

Design: A multidisciplinary examination team comprising of team members from the clinical and basic sciences developed relevant objectives, themes, clinical cases, stations, tasks and the feedback questionnaire. The placement of the clinical cases provided vertical integration and merging of the practical stations for physiology, anatomy and biochemistry provided horizontal integration. Student and faculty feedback questionnaire was administered at the end of the IPE.

Results: Students - 71% of the students agreed that IPE as compared to the traditional practical examination is a better way of assessment and 65% believed that IPE helped them in understanding the clinical application of the practical skills. Faculty - 81% of the faculty members believed IPE was a better way of assessment, 72% responded that IPE evokes critical thinking in the students and 85% of the faculty agreed that IPE should be continued in the future.

Conclusions: The current study indicated that IPE was well received by students and faculty and can therefore be employed successfully for assessing the laboratory skills and practical knowledge of the medical students in the preclinical years.

Keywords: Integrated practical examination; Endocrinology; Reproduction; Medical students.

PP-N-12

Admission Criteria as A Predictor of Performance In Professional Examinations

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Background: Fake and forged results of F.Sc. presented for admission in medical colleges had a negative impact. MCAT was introduced in NWFP in 1996. A combination of F.Sc. marks and ET is in use since then for the purpose.

Objective: This study highlights various parameters for admissions in medical colleges and their correlation with students' performance in professional examinations.

Design: Records of students admitted in Ayub Medical College, Abbottabad, and completed MBBS were analyzed. One session (2001–02) was randomly selected and the available data was entered and analyzed with SPSS-16.

Results: Records of 199 students, 126 males and 73 females, were analyzed. Of these, 95 students got admission on merit, while 104 were enrolled against reserved seats of various categories. No significant correlation was seen between marks obtained in F.Sc. and ET. Significant positive correlation was found between marks obtained in matriculation and overall performance in MBBS. Significant positive correlation was found between ET and all professional examinations. Correlation between F.Sc. marks and marks in all professionals was significant at $p = 0.01$ level. Significant positive correlation between F.Sc. and total performance in MBBS ($r = 0.278$) was observed. Significant correlation was found between combined marks obtained in F.Sc. and ET and marks obtained in all professional examinations.

Conclusions: Matriculation, F.Sc., ET and admissions on merit/reserved seats are predictors of performance in MBBS and the strongest predictor is the combination of F.Sc. and ET marks.

Keywords: MCAT; Performance.

PP-N-13

Importance of Physiology Subject in PBL Based Integrated Curriculum

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Objective: To find out the outcomes of scenario/PBL based teaching in the subject of physiology.

Design: One hundred and ten first year medical students were included in this study. Genetics, reticuloendothelial system, CVS and the respiratory system were taught in two semesters of their first year course. All the modules were mostly based on PBL/ scenario based teaching in which the clinical cases were given and then on the basis of brainstorming and prior clinical knowledge, the students have discussed that problem. Self-study period was given and in the next session the students finally conclude the problem. There is an instructor who facilitates the whole session and plays a passive role, not an active. After the session, a few questions were asked regarding the understanding of the problem, the clearance of physiological concepts, interest in studying the preclinical subjects and the retention of knowledge.

Results: The student's gave a clear preference to PBL/ scenario based teaching over the conventional didactic lecture based teaching because of the clear understanding of the basic physiological concepts, the enthusiasm to read more and more physiology, pathology and medicine books and the retention of knowledge for a long time.

Conclusions: Physiology is a distinguished scientific discipline for understanding the pathology and medicine thoroughly. The PBL/scenario based teaching is very helpful for understanding the concepts and may be considered to replace the conventional method in the near future.

Keywords: Problem based learning (PBL), Scenario based teaching.

PP-N-14

Factors Causing Anxiety and Affecting the Performance of Medical Students in Professional Exams

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Objective: To determine the factors causing anxiety and affecting the performance of students during exams in Ziauddin Medical College.

Design: A cross-sectional study was carried out in the Ziauddin Medical College in which 100 medical students were randomly selected from 1st year to final year and a self administered questionnaire was given. The duration of the study was six weeks from September to November 2009. Socio-demographic and educational characteristics including age, gender, no of siblings, thinking before examination, work under pressure, nervousness, troubled sleeping before examination and excessive course were used to asses the level of depression and anxiety.

Results: The mean age of the students was 20.75 years with a female preponderance, i.e., 56 (56%). Nervousness hindered the performance of 43% students and 80% worked effectively under pressure. 44% students had troubled sleep before exam and 52% were not satisfied with the course load. Students also became anxious and depressed by the change of eating habits during exams and the sense of hopelessness.

Conclusions: Approximately 50% of students were found to have anxiety and depression and their performance was affected in exams due to the mentioned factors.

Keywords: Anxiety, Professional exams.

PP-N-15

Evaluation of Objective Structured Practical Examination and Traditional Practical Examination in Physiology

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Background: Objective structured practical examination (OSPE) is a recently introduced assessment technique for laboratory practical examination in physiology.

Objective: The present study was conducted to evaluate the competency of objective structured practical examination (OSPE) compared to the traditional practical examination (TDPE) as an assessment technique, for assessing the laboratory component of physiology.

Design: The results of physiology practical examination of 400 first year and second year MBBS students of both sexes from 4 medical colleges, two government (Dhaka Medical College, Mymensingh Medical College) and two non-government (Bangladesh Medical College, Medical College for Women) medical colleges under the Dhaka University, Bangladesh from 2004-2005 were analyzed. Scores achieved by the students in OSPE and TDPE were compared and statistically analyzed by the Student's paired t-test, unpaired t-test and ANOVA.

Results: Mean SE score obtained in OSPE was found to be significantly ($p < 0.001$) higher than that for TDPE (77.7 ± 0.67 vs 64.4 ± 0.6). Additionally, mean scores achieved in OSPE were compared among three different medical colleges and the significant difference was noted. In OSPE, the male students achieved significantly higher score than that of the female students, especially in responding question station.

Conclusions: The outcome of the present study thus indicates that OSPE is a better choice as an assessment technique over the traditional method for measuring a wide range of practical skills. Therefore, it is an important technique to highlight competency based performance discrimination and it also helps in improving the student's performance in laboratory exercise in physiology.

Keywords: OSPE; Practical skills; Laboratory of Physiology; TDPE.

PP-N-16

Magic of Powerpoint as an Innovative Teaching and Learning Method

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Background: Today's medical students represent a broad spectrum in terms of age, experience, culture, level of preparedness and learning styles as well. Assessing students preferred style of learning helps in both better teaching and learning.

Objective: Knowing the student's style of learning can help instructors provide students a tailored effective learning. It also motivates the instructors to move from their own modes of teaching to the better ones according to the students requirement for their better academic performance.

Design: A questionnaire which identifies the learning styles was administered to 120 students at Kakatiya Medical College, Warangal. Questionnaire was given asking preferences for 1. Didactic lecture alone, 2. Didactic lecture with OHP; 3. Didactic lecture with PowerPoint presentation and animation, 4. Small group discussions, 5. Problem based learning, 6. Seminars, 7. Self-study, 8. MCQ's after each class and 9. Weekly tests.

Results: The Student t-test was done to analyze the comparison of didactic lecture alone and other modes of teaching learning methods. There was a significant preference for didactic lecture with PowerPoint presentation and animation than other modes of teaching learning methods (p value <0.01).

Conclusions: Student's have significantly different learning styles. It is the responsibility of the instructors to address this diversity of learning styles to enrich their own teaching abilities and improve the student's learning ability as well. Most of our students significantly opted for didactic lecture with PowerPoint presentation and animation.

Keywords: MBBS students; Teaching learning methods; Didactic lecture; PowerPoint presentation and animation.

PP-N-17

A Trial of the Objective Structured Practical Examination in Physiology at Melaka Manipal Medical College, India

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Background: The present study was undertaken in the Department of Physiology, Melaka Manipal Medical College (MMMC), Manipal Campus, Manipal University, India.

Objectives: The present study was intended to determine the reliability and student satisfaction regarding Objective Structured Practical Examination (OSPE) as a method of assessment of laboratory exercises in physiology for first year MBBS students, before implementing it in the university examination in March 2008.

Methods: During the OSPE, students were made to rotate through 11 stations, of which 8 stations were composed of questions that tested their knowledge and critical thinking and 2 stations were composed of skills that students had to perform before the examiner. One station was kept as the rest station.

Results: Performance of the students was assessed by comparing the students' scores in the traditional practical examination (TPE) and OSPE using "Bland-Altman technique." Student perspectives regarding the OSPE were obtained by asking them to respond to a questionnaire. The Bland-Altman plot showed that ~63% of the students showed a performance in the scores obtained using the OSPE and TPE within the acceptable limit of 8; 32% of students scored much above the anticipated difference in the scores, and the rest scored below the anticipated difference in the scores on the OSPE and TPE.

Conclusions: Feedback indicated that students were in favor of OSPE when compared to TPE. Feedback from the students provided scope for improvement, before the OSPE was administered for the first time in the university examination.

FC-O-01

Overweight: An Invitation to Health Risks Early in Life

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Background: In India, overweight has peaked among the urban and the high socioeconomic status (SES) groups of young people. Overweight can lead to health problems such as hypertension, diabetes mellitus, cardiovascular diseases, low bone mineral density, etc, affecting self confidence and increasing stress levels.

Objective: To study whether high body mass index (BMI) is:

- related to high body fat and low bone mass

- has repercussions on blood pressure
- related to high levels of stress and low confidence levels, and
- whether normal weight individuals differ from the overweight in the above mentioned variables.

Design: Matching age, height and SES, 50 overweight (BMI 25 kg/m^2 and above) and 50 normal weight (BMI 18 – 24.9 kg/m^2, control group), female college students, were assessed on BMI, bone mass and body fat by Salter's Analyzer Scale, Model 9106. Stress and self confidence levels were measured by questionnaires.

Results: The results reflect a significant positive correlation between BMI and body fat (r = 0.99), and a negative correlation between BMI and bone mass (r = -0.65) in both groups. The overweight subjects with a high BMI showed higher blood pressure (p >0.01) but no correlation was found in the normal. Normal subjects differed significantly in BMI, body fat, bone mass, blood pressure, stress and self confidence (p >0.01) from the overweight.

Conclusion: High BMI with high blood pressure and low bone mass could lead to possible cardiovascular diseases and skeletal fragility. Overweight subjects were comparatively higher in stress but lower in self confidence than the normal, indicating high implications on the health of young women in today's society of competitiveness. This therefore, merits further study.

Keywords: BMI; Bone mass; Stress; Self-confidence.

FC-O-02
Study of Bone Mineral Density in Overweight Physically Active Postmenopausal Women

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Background: Estrogen deprivation results in decreased bone mineral density (BMD) during menopause. Body mass index (BMI) is positively correlated with bone mineral density (BMD). Fat mass adds to body weight and hence is seen to contribute an independent positive effect on BMD by some and a negative effect by others as those studies were designed in a heterogeneous group of women. Since menopausal women tend to have a higher fat mass and the fat cells being the only source of estrogen, the present study was conducted to ascertain that these menopausal women stand to gain in BMD due to an increase in fat mass.

Objective: To find the difference in the BMD, BMI, fat mass and percentage fat mass (PFM) between osteoporotic and non-osteoporotic groups.

Design: The study was carried out in 300 postmenopausal women at BMD camps held at private hospitals at Pune and Sangli. BMI was calculated using Quetelet's Index. PFM was calculated from the formula based on BMI. The BMD measurement was done by qualitative ultrasound and the result was given in the form of T-Score.

Results: A statistically significant association of BMI with BMD and also fat mass and PFM with BMD has been established. However, a statistically significant positive correlation of BMD with BMI and fat mass and PFM was not seen. This suggests that BMD increases with BMI, PFM and fat mass but not in a linear manner.

Conclusions: This study concludes that some amount of fat is required in the postmenopausal women for the protection of bone mass.

Keywords: BMD; Postmenopausal women; BMI; Fat mass.

FC-O-03
Geometrical Quantification of Cell Membrane Integrity and the Interactions with Body Fluids in Healthy Young Males

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Background: Metabolically active cells of the body have an electrical potential required for carrying diverse

functions. The altered membrane capacity behaviors due to variations in the membrane composition or dielectric nature shows an effect on the membrane permeability, variability in the cell size, intracellular composition, etc, although the membrane potentials are minute or negligible. The membrane potential allows the cell to act in an alternating electrical field such as a spherical condenser which has a sinus wave. This shift is measured in degrees called phase angle (Ø) with the opposing forces offered by the charge carrying ions present in the extra and the intracellular fluids. Well-nourished cells with stable membrane potentials have larger phase angles, whereas poorly nourished cells with low membrane potentials correspondingly have smaller phase angles.

Objectives: 1. To assess the cell membrane integrity in young adults of males (50 KHz) based on the frequency dependant impedance values measured by a geometrical constraint 'phase angle', 2. To study the degree of association between cell membrane integrity and body fluids.

Design: A cross-sectional study was conducted on 70 healthy men in the age group of 20 - 30 years using the tetra polar 8 tactile Bioelectrical Impedance Analyzer.

Results: The measured mean phase angle is $6.07^0 \pm$ 0.4013. The interactions between phase angle with surrounding fluids, BCM and FFM independently was not showing significant correlation whereas the ratio of metabolically suspended cells in the fat free mass was showing significant correlation ($r = 0.873$) and also with the ratio of internal and external conductors with TBW of fat free mass ($r = 0.846$; $r = -0.846$). High significant correlations is observed between BCM/FFM and phase angle in the segmental portions (RA = 0.641, LA = 0.619, RL = 0.848, LL = 0.840) but less with trunk ($r = 0.458$) at $p < 0.0001$ which determines the uneven distribution of fat cells and body cell mass when compared to segments.

Conclusions: The above results determine that the volunteers have optimally nourished cells with stable membrane potentials and also suggest that the trunk impedance and reactance values are sensitive to the nutritional status of the cell.

Keywords: Cell memebrane integrity.

FC-O-04
Anthropometric Measurements in Arab Medical Students

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Background: Obesity is a major risk factor for many diseases, including diabetes, hypertension and heart disease. This pandemic is also affecting university students.

Objective: Anthropometric measurements in Arab medical students were taken over the last eight consecutive years at the Arabian Gulf University (AGU). The aim of this study was to see any pattern of change in this population.

Design: This was a cross-sectional study where anthropometric measurements were collected in 709 medical students during a laboratory class on anthropometry. Measurements included body fat %, BMI, waist to hip ratio and skin fold measurements. Informed consent was obtained from the subjects and the study was performed according to the Declaration of Helsinki. One-way ANOVA was used and Bonferroni's post hoc analysis was used. All the tests were two-tailed and the level of probability taken as significance was 5% ($p < 0.05$).

Results: For all students, the mean BMI (±SD) was 24.16 ± 5.73 kg/m^2, range 15.65 to 50.76 kg/m^2 and the mean age (±SD) was 19.60 ± 1.04 years. The BMI ($p < 0.001$), % fat mass ($p < 0.0005$) and the centrality index ($p < 0.0001$) all significantly increased over the eight years.

Conclusions: A significant increase in obesity and central body fat distribution were noticed over the last eight years in this population. It is of concern that these students are increasing their risk factors for disease. AGU should consider steps to reverse these trends, such as encouraging a healthy lifestyle.

Keywords: Obesity, Medical students, Arab, Healthy lifestyle.

FC-O-05

Indirect Estimation of Body Fat Percentage (BF%) from Waist Girth (WG) of the Adult Males in the Service Sector

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Background: The study was conducted to establish the relationship between WG and BF% of sedentary adult males.

Objective: Prediction of the BF% by using only WG.

Design: The study was conducted in Phase - I and Phase - II.

Results: In the Phase - I, WG and BF% of 136 adult males working in the service sector in the age group of 40 - 50 years (experimental group) were measured by the anthropometric method. The mean (±SD) of age, height and weight of the ex-gr are 46.7 (±8.10) yrs, 164.4 (±6.36) cms, 63.1 (±11.54) kgs respectively. A prediction equation for BF% was developed by using WG [FAT% = 0.4*, WG + (-9.9)]. The correlation coefficient (CC) of predicted fat% is 0.69 and the mean square error (MSE) is 17.13. In the Phase-II, 61 new subjects in the same age group - 43.9 (±7.66) yrs, 164.7±5.58 cms, 62.1±9.69 kgs) were selected at random from the same service sector (validation group) and BF% was measured by the anthropometric method. BF% was also predicted by using the prediction equation developed in the Phase-1. The test – retest correlation shows high CC (r = 0.70) with MSE (7.36). The higher CC proves the accuracy of the prediction equation.

Conclusions: The prediction equation developed in the present study can be effectively used to determine the BF% from the WG of the adult male working in the service sector in the age group of 40 - 50 years.

Keywords: Waist girth, Body fat percentage, Prediction equation.

PP-O-06

Prevalence of Obesity and Regional Distribution of Body Fat and Skeletal Muscle Mass Among Students in a Malaysian Medical School

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Background: Estimation of body composition (BC) is strongly recommended in obesity and nutrition research. It has an edge over body mass index (BMI) in quantifying and providing regional distribution of its components.

Objectives: This study was designed to measure the changes in obesity prevalence and the risk groups that are associated with excess visceral fat.

Design: Age-matched 277 (mean 20 + years) preclinical male (86) and female (191) students were included in the study. BMI, body fat, skeletal muscle mass and their pattern of distribution and the resting metabolism were recorded using Body Composition Monitor – HBF- 362 model (Omron). The subjects were divided into undernourished (UN = BMI <18.5), normal (N = BMI >18.5) and overweight/pre-obese or obese (Ob = BMI >23) groups based on the BMI cut-off points for Asian population.

Results: The results revealed that 47% of the male (mean BMI = 28) and 31% of the female (mean BMI = 27) were obese. The total body fat was high at 24% in the obese males and at 34% in the female obese as compared to the other two groups. The subcutaneous fat was more in the arms and legs than in the trunk area in both males and females. The visceral fat was high in the obese males (mean; 10.6) whereas obese females had normal levels at <10. The skeletal muscle mass constituted about 33% in the obese males and 25% in the obese females which was slightly less than the recommended normal range. The leg area had more muscle mass than the other areas.

Conclusions: The data supports the view that obesity is increasing globally as compared to previous reports of 25% obese individuals for the similar population. Data on the body age of the obese group indicated metabolic changes that would occur at 40 years of age had already began at 20 years of age both in the male and the female which can be ascribed to high fat levels. The male group had developed more health risks as observed with higher visceral fat. This change in body composition in young obese subjects is a strong indicator of poor health behavior and life style practices.

Keywords: Body composition, Obesity, Distribution of body fat, Skeletal muscle mass.

PP-O-07

Anthropometric, Hematological And Nutritional Status of Female Tea Pluckers of a Tea Garden in Dooars, West Bengal

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Background: The tea industry occupies a place of considerable importance in the Indian economy and about 60 – 66% of the total work force in a tea garden is engaged in plucking operations. These plucking operations are exclusively done by the women.

Objectives: As poor socio-economic conditions, ignorance due to illiteracy and the unhygienic living conditions in the residential colonies make the tea garden population vulnerable to various communicable diseases and malnutrition, the objectives of this study were to describe the various anthropometric indicators of female tea pluckers and also to investigate the association, if any, between the hemoglobin level and BMI with work productivity.

Design: All women who had worked as tea pluckers during the immediately preceding month excluding those who were pregnant, were recruited for this study. Socio-demographic variables, health and diet variables were surveyed and the standard of living index (SLI) was calculated. Different physiological variables and anthropometric variables were measured. Hemoglobin concentration was measured instantly and the productivity of each tea plucker was measured in terms of green leaf yield (in kgs) per day. One-tail t-test and two-tail chi-square test were performed for the data analysis.

Results: Almost all the subjects of our study population were anemic. A strong association between anemia and productivity were observed. Female tea pluckers with lower hemoglobin concentration, lower BMI and lower mid upper arm circumference showed less productivity. Much lower hemoglobin concentrations were found in subjects with lower SLI.

Conclusions: Adequate dietary supplies were required for the workers engaged in the occupation which demands continuous physical labour.

Keywords: Female tea pluckers, Hemoglobin, BMI.

PP-0-08

Development of New Equations for Basal Metabolic Rate for Adoloscent Student Indian Population

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Background: There is a growing clinical emphasis for the measurement of BMR and energy expenditure in clinical and research investigations. Hence, there is a motivation towards calculating basal metabolic rate using standard equations.

Objective: The objective of the present work is to identify an appropriate equation in the Indian environment for the estimation of calorie needs and basal metabolic rate using the measured height, weight, age and the skin fold parameters of an individual. The equations for the estimation of basal metabolic rate of adolescent male and female population aged between 17 - 20 years are suggested to be based on the weight of the individual.

Design: Basal metabolic rates are evaluated in 152 healthy, adolescent medical student population whose age is ranging from 17 – 20 years. 152 subjects considered in this study comprised of 98 male students and 54 female students. Age (years) and anthropometric parameters (height (cm) and weight (kg)) were noted. Skin fold parameters measured were biceps (mm), triceps (mm), subscapula (mm) and suprailiac (mm). Basal metabolic rate is calculated using skin fold parameters. Body density is calculated using skin fold parameters. This body density is related to body fat and fat free mass. Basal metabolic rate (BMR) is computed using fat free mass (FFM) employing Cunningham's equation (BMR = 501.6 + 21.6 (FFM). Thus, the calculated basal metabolic rates are considered as benchmark values. These basal metabolic rates are used to generate equations based on the weight of an individual. Basal metabolic rates are also compared with the recent correlations reported in the literature.

Results: The equations generated for basal metabolic rate based on this study were BMR = 0.0515 (Weight) + 3.4959 for males aged around 18 years and BMR = 0.055 (Weight) + 2.8928 for females aged around 18 years.

Conclusions: Equations suggested in the literature are not able to predict the BMR for Indian population. Hence, there is a need to generate equations for basal metabolic rate for Indian population.

Keywords: Basal metabolic rate, Indian population.

PP-0-09

Study of the Effects of Nutritional Status on the Audio-Visual Reaction Time

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Background: The reaction time increases with the severity of undernutrition. The total, premotor and motor reaction time for audio as well as visual stimuli will be affected in the undernourished children.

Objective: 1. To assess the nutritional status by anthropometric measurements. 2. To determine the visual and auditory reaction time using reaction time apparatus.

Design: The study group included 30 children between the age group of 10 - 12 years. Ethical clearance was obtained and an informed consent was taken from the parents/guardians of the children. The children were assessed for nutritional status by measuring the height, weight and the skinfold thickness using skin calipers. BMI was calculated using Quetlet's index (weight/height^2).

The visual reaction time [red (VRT - R) and green (VRT - G) lights] and auditory reaction time (ART) was assessed using indigenously designed reaction time apparatus. The data thus obtained was analyzed using Pearson's correlation.

Results: Fat free mass had negative correlation with VRT- R (r = -0.305), VRT - G (r = -0.308) and ART (r = -0.058); whereas BMI had negative correlation only with VRT - G (r = -0.058).

Conclusions: As the fat free mass and BMI decreased (indicating undernourished status) the reaction times for visual and auditory stimuli increased.

Keywords: Nutritional status children, Visual reaction time, Auditory reaction time.

PP-0-10
Study on the Impact of BMI Cut-offs for Asian Indians on the Medical Students

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Background: Obesity has been reported to be an independent risk factor for the development of cardiovascular disease. Most of the studies conducted have reported that the increased cardiovascular risk is associated with lower BMI in Indian population. Recently a new body mass index cut-off defining obesity in Asian Indians has been proposed.

Objective: We aimed to identify the impact of the new guidelines for obesity for Asian Indians on the medical students of our college by comparing it with the WHO defined cut-off values. It was hypothesized that decreasing the BMI cut-off will increase the prevalence of obesity.

Design: One hundred and seven medical students of both genders with the mean age of 19 ± 2 years who were otherwise healthy were recruited for the study. They were divided into groups based on the BMI cut-offs under WHO guidelines and that for the Asian Indians.

Results: We observed that under the WHO classification there were 72 subjects under normal BMI, 20 subjects in the over weight category and 6 in the obese category. Under the new BMI cut-offs for Asian Indians the number of subjects under obese and overweight category increased to 27 and 22 respectively, whereas those under normal reduced to 52. When classified gender wise, as per the WHO classification there were 5 females as compared to one male under the obese category. On the other hand there were 12 male and 15 female subjects falling in the obese category under the Asian cut-off.

Conclusions: The new classification exposes an increased prevalence of obesity in the present study group of medical students.

Keywords: Body mass index, Obesity, Medical students, India.

PP-0-11
Role of Vitamin B_{12} in Modulating Resting and Noradrenaline Stimulated Energy Expenditure in Healthy Adults

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Background: Vitamin B_{12} (5-deoxyadenosylcobalamin) deficiency is prevalent in the largely vegetarian Indian community. Vitamin B_{12} functions as a coenzyme and its deficiency has been demonstrated to affect various stages of energy metabolism through disturbances in mitochondrial function in mammals. Reducing energy expenditure through this mechanism could have implications for the role of vitamin B_{12} in

the development of adiposity and downstream morbidity. However, there is lack of evidence to support this hypothesis in humans. We undertook this study to assess if human vitamin B_{12} deficiency could result in lowered energy expenditure in a simulated stressed state, during a noradrenaline infusion.

Objective: To assess the resting and noradrenaline induced thermogenic response (oxygen consumption, respiratory quotient (RQ), energy consumption and substrate oxidation) in vitamin B_{12} deficient and replete human subjects.

Method: 21 healthy adult males between 18-40 years underwent assessment of serum vitamin B_{12}, haemogram, anthropometry, physical activity level, dietary intake, nerve conduction and cognition. They were divided into vitamin B_{12} deficient or replete based on a plasma vitamin B_{12} cut-off of 132 pmol/l. Noradrenaline (dose: 0.1 microgram of noradrenaline per kg fat free mass) was infused for 1 hour using a Braun Perfusor pump. Indirect calorimetry and cardiovascular monitoring went on throughout the noradrenaline infusion. Average data segments for all parameters were considered at 0-15, 20-35 and 45-60 minutes for analysis.

Results: Age and vitamin B_{12} were significantly different between the vitamin B_{12} deficient and replete groups. Oxygen consumption and energy expenditure increased significantly in both vitamin B_{12} replete and deficient group ($P<0.01$). Vitamin B_{12} replete group had significantly higher oxygen consumption and energy expenditure at 20-35 min and 45-60 min time points after controlling for age and basal values ($P<0.05$). RQ decreased and fat oxidation (gm/min) increased in both the study groups without any group differences.

Conclusion: Vitamin B_{12} level appears to reduce the norepinephrine stimulated thermogenic response in otherwise healthy, vitamin B_{12} deficient human subjects. It will be interesting to evaluate the role of vitamin B_{12} supplementation on the thermogenic response in vitamin B_{12} deficient subjects.

Key words: Noradrenaline; Energy Metabolism; Vitamin B_{12}; Thermogenesis.

PP-0-12

Perception of Body Image in Urban and Rural South Indian School-going Children: the Association with Socio-Economic Status and Current Body Weight

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Background: Overweight and obesity are emerging problems in developing countries where undernutrition and underweight continues to be highly prevalent. Body image perception may be associated with acceptability of weight gain. The aim of this study was to evaluate the extent to which socio-demographic factors affected the perception of body image in school-going children.

Methods: Data were collected in 1902 children (boys 895, girls 1012) school going city and non city children from various socioeconomic status (using medium of instruction as surrogate) between 8 and 14 years. Height and weight were measured. Children were categorized as normal weight, underweight and overweight/obese using BMI-for-age Z scores. A simple questionnaire was used to assess children's perceptions of current and ideal body image. Concordance between body image perception and actual weight category was examined. In addition, discordance in body image perception with the current weight status was examined based on degree of under and overestimation. These were analyzed using chi-square test and multi-nomial regression.

Results: Girls, children of more educated parents, and children resident in the city were more likely to be overweight (all $P < 0.001$). Preadolescents and those studying in lower socio-economic schools were more likely to perceive themselves to be underweight (AOR: 1.63, CI: 1.25-2.11 and 1.87, CI: 1.32-2.65). Underweight children were ten times more likely to overestimate their current weight status while overweight children were four times more likely to underestimate it. Boys and children in lower socio-economic schools were less likely to desire a thinner

body image (AOR: 0.69, C.I: 0.53-0.90) and AOR 0.45, C.I: 0.31-0.66). Underweight children desired to be thinner (AOR: 0.63, C.I: 0.45-0.88), while overweight children strongly desired to become thinner (AOR: 2.51, C.I: 1.65-3.81).

Conclusions: Socioeconomic status is a determinant of perception of body image. Around 50% of children accurately perceived their current body weight category. While overweight was more prevalent in higher socio-economic school children, those from low socioeconomic schools underestimated their body weight and were less likely to desire to be thinner; the implications of this need to be prospectively evaluated.

PP-B-26

Alterations in Autonomic Response at High Altitude: A Comparative Study Among Acclimatized Low Landers, High Altitude Natives and Low Landers

Priyanka Dhar, Vijay K. Sharma, Saroj K. Das, Kalpana Hota, Sunil K. Hota and Shashi B. Singh
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Background: Autonomic nervous system plays an important role in regulating physiological processes during normal and pathophysiological conditions. Exposure to hypobaric hypoxia leads to physiological changes like sleep disturbances, hypophagia and AMS symptoms which could be attributed to alterations in autonomic responses.

Objective: The present study comparatively evaluates the autonomic functions of high altitude natives, acclimatized lowlanders with different duration of stay at high altitude and low landers to assess the effect of prolonged stay at high altitude.

Methods: To investigate the effect of cardiovascular changes heart rate variability (HRV), mean SBP, DPB, PR and other cardiovascular measures were estimated. The time and frequency domain variables, geometric, nonlinear and spectral measures of HRV were evaluated. We examined the effects of duration of stay at high altitude on HRV of 213 subjects (51 acclimalized low landers with > 6 months duration at high altitude, 55 low landers with < 6 months stay at high altitude, 53 native people of high altitude and 54 low landers serving as control) aged 25 to 35 years. Using their surface electrocardiogram, we calculated the HRV indices with spectral analyses. Low frequency (LF) and High frequency (HF) power were used to index sympathetic and parasympathetic activity respectively. The ratio of low to high frequency power (LF/HF) was used to index sympathovagal balance.

Results: In the present investigation the LF/HF ratio was decreased in acclimatized low landers indicating parasympathetic dominance in the autonomic response. The ratio is slightly higher in the native population when compared to the control group.

Conclusions: This present study therefore establishes the role of autonomic responses during acclimatization to high altitude.

FC-I-32

Physiological and Metabolic Correlates of AMS

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Background: Ascent to high altitude is often associated with decreased partial pressure of oxygen that leads to reduced oxygenation of the arterial blood. Hypobaria, as it is known therefore leads to several adverse effects on the physiology, the initial symptoms which are identified as acute mountain sickness. Symptoms include headache, fatigue, stomach illness, dizziness, and sleep disturbance. The Lake Louis Score

has been widely accepted as a standard method for assessment of AMS. Interestingly no physiological or molecular parameter has been found to absolutely correlate with altitude sickness which makes prediction of probability of occurrence of AMS quiet preemptive. The present study therefore aimed at exploring a correlate between diastolic and systolic blood pressure, SpO2 and pulse rate and the susceptibility to AMS in healthy human subjects who were never exposed to high altitude conditions previously.

Materials & Methods: 46 human volunteers between the age group of 25-35 were studied during the investigation. The baseline data of waist/hip ratio, SpO2, systolic and diastolic blood pressure in sitting, standing and supine positions and pulse rate was taken at rest at an altitude of 2350 ft. The subjects were then made to ascent to an altitude of 11,500 ft rapidly within 5 hrs. On reaching 11,500 ft the subjects were made to take rest in sitting position for 15 min following which waist/hip ratio, SpO2, systolic and diastolic blood pressure and pulse rate was measured and blood samples were collected to measure serum metabolites.

Results: Alterations in pulse rate, autonomic responses, EEG waves and serum metabolites were observed following ascent to high altitude several of which showed positive correlates with AMS symptoms.

Conclusion: Pulse rate and serum metabolites are more reliable parameters for predicting susceptibility to AMS.

FC-G-29

Biomedical Aspects of Neurophysiology at High Altitude

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Background: The decrease in partial pressure of oxygen influences both physical and mental performance of sojourners and acclimatized lowlanders. The brain being highly dependent on oxygen supply is most vulnerable to hypoxic stress.

Objective: The present study aimed at investigating the cognitive changes following high altitude exposure and the molecular mechanisms involved therewith. The efficacy of several prophylactics and therapeutics were also evaluated

Methods: Male Sprague dawley rats were exposed to simulated hypobaric hypoxia for different durations and behavioural, biochemical and molecular studies were performed to study the effect of hypoxia on cognitive functions.

Results: Investigations in animal models exposed to simulated altitude also showed decline in short term memory following exposure. There was depletion in the antioxidant status along with increased free radical generation. Neuromorphological studies revealed neurodegeneration and dendritic atrophy in the hippocampus. Altered neurotransmitter synthesis, release and metabolism were also observed along with occurrence of calcium overload in neuronal cells. Administration of N acetyl cysteine to animals exposed to hypobaric hypoxia showed considerable improvement in memory functions along with decrease in free radical generation. Acetyl-L-Carnitine administration during hypobaric hypoxia also improved the cognitive capabilities in animal models.

Conclusion: These findings establish the prophylactic and curative potential of Acetyl-L-Carnitine for high altitude maladies and amelioration of hypobaric hypoxia induced cognitive dysfunctions.

PP-M-07

Effect of Stay at 4200m on Cognitive Functions of Acclimatized Low Landers

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Background: Ascent to high altitude results in decreased oxygen saturation in the cerebral circulation resulting in hypobaric hypoxia. Decline in cognition and

alterations in mood have been previously reported in human volunteers, following ascent to high altitude. The co-relates of cognitive decline with EEG changes have however been less studied.

Objective: The present study aimed at investigating the effect of chronic stay at an altitude of 4200m on the cognitive performance and EEG changes of acclimatized low landers (ALL)

Method: The study comprised of two groups of human volunteers viz: Lowlanders (n=83) and acclimatized lowlanders staying at high altitude (n=67). Inclusion criteria for the volunteers comprised of age group 25-35, good health and functional ability and without any history of diseases or familial disorders. Medical history included the questions regarding subjects' previous health status from childhood to the age. MMSE was done for the screening of subjects with memory loss and mild cognitive impairment. Beck depression inventory was assessed for the diagnosis of any mood disorder or depression. Neuropsychological analysis was done with the help of newly invented SBS-MCI Score and MMSE simultaneously. EEG signals were recorded from all the volunteers and High Resolution EEG techniques were implied in order to prepare brain maps and determine the Power Spectral Density (PSD).

Results: Cognitive declines in the acclimatized low landers when compared with age matched, healthy normal group of low landers, which is assessed by MMSE and SBS-MCI Score. Beta power decreases in the EEG signals of MCI subjects when compared to the normal EEG signals.

Conclusions: Cognitive alteration observed on stay at high altitude could be attributed to changes in EEG signals.

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