

SAAPCON 2016

5th Biennial Conference of South Asian Association of
Physiologists (SAAP)

In conjunction with

2nd Annual Conference of Physiological Society of Nepal
(PSN)

Kathmandu university, Dhulikhel, Nepal

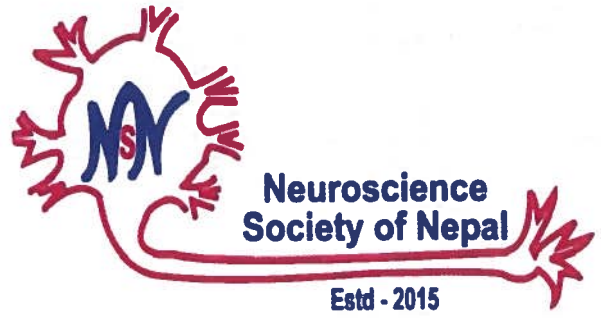
10-12 November, 2016

ABSTRACT BOOK

Organized by:



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SAAPCON- 2016

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Physiological Society of Nepal (SAAP)**

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(PSN)**

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Redefining Health in Nature

ABSTRACT BOOK

Organized by:



Physiological Society of Nepal (PSN)

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Preface

This is a souvenir of SAAPCON-2016 especially designed to publish abstract received by SAAPCON-2016 to be held on 10-12th November 2016 organized by Physiological Society of Nepal (PSN) at Kathmandu University, Dhulikhel, Nepal.

This souvenir of SAAPCON-2016 includes abstract of original articles, guest lectures, plenary lectures, symposium presentation, oral and poster presentations. All the authors of published abstracts in this issue were requested/ invited as per the guidelines given in official website: www.saapnepal2016.org.

This Souvenir includes praiseworthy, invaluable, and encouraging messages from Honourable Prime Minister of Nepal, President of SAAP, Vice Chancellor of Kathmandu University, General Secretary of SAAP, SAAPCON-2016 Chairman, SAAPCON-2016 General Secretary and President of Neuroscience Society of Nepal (NSN).

After submission of abstracts online, all the presenting, submitting or corresponding authors were notified promptly by automated message and also by email: saapnepal2016@gmail.com and by telephonic conversation to local (Nepalese) authors about the submission of abstracts.

Being first and historic event in Nepal and taking into account the requests from prospective participants at SAAPCON-2016, the LOC extended twice the deadline for abstract submission.

In this souvenir, the abstracts from participants are considered for presentation in one of the following formats: Oral and poster format. The time allotted for oral and poster are given in program book. The symposia, oral and poster presentations, pre-conference workshop, and young scientist presentations will be held in three days of conference.

Poster is a visual display of presentation. The posters will be hung one hour prior to the start of poster session and will be removed on the same day one hour before the end of session.

The scientific committee, editorial committee and experts have only corrected font type, size and typographical and minor syntax error as per the template for abstract submission seen in the website.

Editorial board accepted all the abstract received by scientific committee considering the fact that listed authors of received abstracts have no conflict of interest in the content of presentation.

Besides, the editorial board of SAAPCON-2016, we are greatly indebted to many distinguished Nepali physiologists such as Professor Dr Tara Man Amatya, Chairman, SAAPCON-2016; Professor Dr B H Paudel, Dr Rita Khadka, Dr Mrigendra Amatya, Dr Narayan Mahotara, Miss Grishma Baskota, Dr Lava Shrestha, Mr Mukesh Kumar Jha, Dr Ojashwi Nepal, Umesh

Bhattarai, Dr Bipin Shrestha, Dr Bikalp Thapa, Mr Rajan Pandit and whole team of national and international members of scientific committee, national and international advisory board members of SAAPCON and SAAP executive body.

College of Medicine, Nepalese Army Institute of Health Sciences (NAIHS-COM); Department of Physiology, Kathmandu University School of Medical Sciences (KUSMS) and Department of Basic and Clinical Physiology, BP Koirala Institute of Health Sciences (BPKIHS) were provided invaluable support to published scientific program. Miss Jebika Maharjan (NAIHS, Physiology), Dr Barun Mahat (NAIHS, Physiology), Mr Prakash Limbu (NAIHS, Physiology) Dr. Sunil Dhungel (NAIHS, Physiology) and Kathmandu University, office of vice chancellor (Especially Miss Ambika Thapa, Mr Krishna Adhikari) were provided photos printed in program book, conference layout engineering design respectively. The printing material used in program book, abstract book are nontoxic, ecofriendly and finalized by using minimum draft and wastage of materials were typed by Mr Prakash Limbu and Dr Barun Mahat at NAIHS-COM.

Finally, we are very thankful to all authors who have submitted their scientific works with in deadline. Without them, it was unimaginable to prepare this souvenir (abstract book).

Date: 10th November 2016 (Kartik 25, 2073, NAIHS-COM, Department of Physiology)

Souvenir and Program book layout designers and Editors:

Dr. Sunil Dhungel,
Mr Prakash Limbu
Dr. Barun Mahat

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Welcome Messages

Welcome Message from Honorable Prime Minister of Nepal



The Prime Minister

**KATHMANDU
NEPAL**



Message

It is a great pleasure for me to know that the Physiological Society of Nepal (PSN) is going to organize the 5th Biennial Conference of South Asian Association of Physiologists (SAAPCON-V) in conjunction with the 2nd Annual Conference of Physiological Society of Nepal (PSN) at Kathmandu University, Dhulikhel, Nepal on 10-12 November, 2016. I congratulate the organizers of this conference for their effort and hard work to make a platform of discussion on important aspects of healthy lifestyle, sport physiology, neurosciences from concepts to molecules and recent advancements. I am again impressed to know that physiologists, scientists and researchers are also going to discuss on the subjects of high altitude physiology/medicine, yoga, meditation and physiology and wellness during this conference. To do research for better understanding about these subjects is very much relevant to our country Nepal, where Nepal could contribute new knowledge in the field of medical sciences to the world for better human health and happiness.

I wish this SAAPCON-V conference a grand success and participants to have a pleasant stay in Nepal.

Puspa Kamal Dahal 'Prachanda'

October, 2016

Welcome Message from Vice-Chancellor of Kathmandu University, Nepal



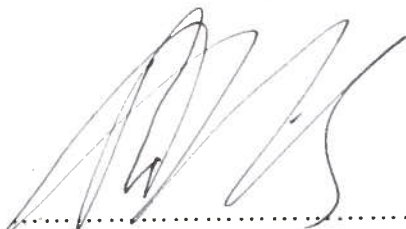
Message

It gives me immense pleasure to welcome all participants of the 5th Biennial Conference of South Asian Association of Physiologists in conjunction with 2nd Annual Conference of Physiological Society of Nepal. I have always believed that physiology is the foundation of medicine. No wonder, what we often call Nobel Prize in Medicine is in fact, officially Nobel Prize in Physiology or Medicine. Physiologists have a major role to reshape the medical science of the 21st century. I consider three key things in this context. The first is, physiologists need to be more actively involved as collaborative partners in health service delivery. There is no field in clinical medicine that does not require or benefit from the expertise of physiologists. Second, physiologists need to emerge as the leaders in health sciences research since every field of health sciences from basic to clinical have some link with physiology. Third, physiologists need to be forerunners in health sciences education. Without a strong foundation in physiology, health sciences education becomes very weak.

I really appreciate the theme of the conference 'Redefining health in nature'. Nepal offers unique opportunities in terms of physiological studies because of the diversity we find in geography, climate, ethnicities, origins and culture. I have always believed, Nepal itself can be one of the best laboratories in these fields in the world. Let us harness this potential.

I have read stories of Frederic Banting who won Nobel Prize in Physiology/Medicine in 1923, when he was just 32 years old, for the discovery of insulin. I sincerely hope, this scholarly gathering will someday lead to breakthrough discoveries in future that will do remarkable service to the mankind. As the vice-chancellor of Kathmandu University, I assure you of full personal and institutional support for the noble works you are doing.

I wish a great success of the program.



Prof. Dr. Ram Kantha Makaju Shrestha
Vice Chancellor
Kathmandu University

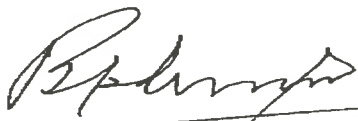
Welcome Message from Vice-Chancellor of B.P. Koirala Institute of Health Sciences, Nepal



I am very delighted that Physiologists of Nepal are going to organize the 5th Biennial Conference South Asian Association of Physiologists in conjunction with the 2nd Annual Conference of Physiological Society of Nepal (SAAPCON-2106) on November 10-12, 2016 at the Kathmandu University, Dhulikhel. The theme of the conference is "Redefining Health in Nature". This conference is going to be held for the first time in Nepal.

We know that contribution to physiology is contribution to medicine. I believe that this conference will disseminate knowledge and skill pertaining to the discipline and related aspects and teaching and learning involved in making the conference a success. I am further delighted to learn that the Department of Physiology, B.P. Koirala Institute of Health Sciences, Dharan is continuing the conference as a Post-Conference Workshop at our premises.

I would like to warmly welcome all the delegates to Dhulikhel and Dharan.

A handwritten signature in black ink, which appears to read 'Balbhadra P. Das'. The signature is written in a cursive style with a horizontal line underneath.

Prof. Balbhadra P. Das
Vice Chancellor
B.P. Koirala Institute of Health Sciences, Dharan, Nepal

Welcome Message from President of South Asian Association of Physiologists



It gives me a great pleasure to write this message at the eve of 5th Biennial Conference of South Asian Association of Physiologists (SAAP V) to be held in Kathmandu University (KU), Dhulikhel, Nepal from 10-13 November, 2016. South Asian Association of Physiologists (SAAP), is a non-profitable professional organization committed to the development of physiology and the physiologists. On behalf of all the members of SAAP, I would like to express my special thanks to the organizing committee of SAAP V for hosting this conference. As you know, arrangements for a conference of this sort are very complex and difficult.

This event is the culmination of an enormous collective effort which began by a Preliminary brain storming session that was planned along the sidelines of the annual conference of the Physiological Society of India held in Faridabad, Haryana, India on Dec 06, 2007. Then the first Biennial Conference of SAAP was held in Islamabad, Pakistan from Nov 14-16, 2008. However, the 2nd was took place in Bangalore, India 2010, 3rd was in Sri Lanka 2012 and 4th was in Dhaka, Bangladesh 2014. In recent years, we also witnessed 'SAAP BULLETIN' - A biennial scientific newsletter from SAAP is being published.

We believe that the leadership and the hard work of organizing committee will make this conference a successful one. The preconference workshop on "Learning through 21st century" will be an excellent opportunity for the researchers and the educators to update their knowledge and skills to certain core competencies such as collaboration, digital literacy, critical thinking, and problem-solving.

I hope the participants of SAAP V conference will gain exclusive knowledge and get opportunity to meet with expert researchers of various topics. The interactive symposia, free paper sessions and poster presentations will create an opportunity for the young scientists to exchange knowledge and technology with the scientists of home and abroad.

I expect that the participants of this conference will experience a cordial reception, warm hospitality and enjoyable moment by visiting this charming city of Nepal.

I congratulate all the participants and wish a successful completion of this conference.



Professor Dr. Noorzahan Begum

President

South Asian Association of Physiologists (SAAP)

2014-2016

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Welcome Message from Secretary General of South Asian Association of Physiologists



The physiologists engaged in research, teaching and other associated disciplines of SAARC countries felt the need for a long time to form a forum to combat the common challenges in improving quality and spread of physiology education and research in the region. In 2007, to materialise the idea, Prof. Arif Siddiqui of Aga Khan University of Karachi, had contacted a number of senior physiologists of Bangladesh, India, Pakistan and Sri Lanka ; the idea got momentum and subsequently an Adhoc Steering Committee was formed to promote and persue the objective to move further.

In the same year, in the Annual Conference of the Physiological Society of India (2007) in Manav Rachana Educational Institutions at Faridabad, a special meeting was convened by the Organizing Secretary, Prof. Gulsan Khanna in consultation with PSI Executive commttee members, Prof. Amar K Chandra, Prof. Kusal Das, Prof. (Mrs.) D. Guha and Dr. Shymal RoyChoudhury on 7th December , 2007 that was attended by senior physiologists of Universities and Medical colleges of India, Dr. Abdul Majid Diwan of Bangladesh and Dr. Siddiqui of Pakistan as invitee. In that meeting, formally 'South Asian Association of Physiologists' (SAAP) was formed; Dr. Siddiqui was given mandate to approach all the physiological societies of South Asian countries and given the responsibility to draft the by-laws of SAAP. After exchanges of ideas and inputs from different corners of the region, the draft document took a formal shape in January, 2008.

In the mean time the Adhoc Steering Committee was agreed to organise the 1st Conference of SAAP at Shifa College of Medicine , Islamabad along with the Biennial Confernce of the Pakistan Physiological Society under the great leadership of Prof. Muhammad Aslam, the then Principal of the college in November, 2008.. The Organizers of the first conference of SAAP was so much keen to fulfil the objectives of SAAP that they have invited all most all the office bearers of nationally recognized physiological societies of the south Asian region, provided them grand hospitality. Meeting of first General Council of SAAP was held on 16th November, 2008, and discussed the strategies for growth of the Association and the General Council also elected the Executive Council as per by-laws of the SAAP for two years. In that Conference, a good number of delegates including senior most faculties from all the physiological societies of the different counties were present along with the representatives from different parts of Pakistan and delegates from Iran and other countries. The deliberations were scientifically rich, the cooperation among the participants were friendly and in its first meeting , SAAP has turned in to a family with bonding among the members of member societies after having their long desired platform. The 1st Conference ended with grand success.

The congenial platform that formed in Islamabad, further strengthened in its subsequent biennial conferences in Bangaluru (2010), Colombo (2012) and in Dhaka (2014) respectively. In all the conferences, the enriched scientific programmes were followed by pre- or post conference workshops on medical education on different issues. Besides, the members of member societies of SAAP (BSP, PSI, PPS, PSSL and newly formed PSN) delegates from international physiological organizations took active part. Gradually funding from international organizations became available in addition to generous support of national Government and non-Government organizations of the respective countries.

As a consequence, pre-scheduled Vth SAAP Biennial Conference in Kathmandu, Nepal has been possible though this small country faced great natural challenges in the recent past. We the founder members have in mind that we should at least complete the first circle by successfully conducting biennial conferences at least in the regularly participating five physiological societies of five countries that ultimately came in reality only through the cherish desire of its member societies.

During this period, its Secretariat established in Colombo, SAAP By-Laws have materialised successfully, elected Executive Councils functioning properly, publishing official Newsletters and Bulletins, organizing workshops and seminars, It has already achieved recognition from International Physiological Organizations. However, its formal registration under South Asian Association of Regional Cooperation (SAARC) is under process. Last but not least, there are several challenges of which some are important. Three countries of the region – Afghanistan, Bhutan and Maldives are yet to be included in the SAAP list as these countries have no physiological society. Certain reforms in By-Laws, specially for the nomination of office bearers of SAAP Executive council and others are found important. All these issues including regular agendas of SAAP will be discussed in this conference.

I am confident that the present Biennial Conference in the serene ambience of Kathmandu and organised in such a reputed institution will be a scientifically rejuvenating experience. The Organizing Secretary and Convener with entire team deserve to be congratulated for this great venture.



Prof. Amar K Chandra
Secretary General
South Asian Association of Physiologists (SAAP)

Welcome Message from Chairperson of Organizing Committee of SAAPCON-2016



It is a great privilege for me to welcome you all in this historic and prestigious inaugural ceremony of the **"Fifth Biennial Conference of South Asian Association of Physiologists (SAAP) 2016"** and the **"Second Annual Conference of Physiological Society of Nepal (PSN)"**.

Our eastern philosophy teaches us to wish "Sarbe Bhawantu Sukhina, Sarbe Santu Niramaya" i.e. let all be happy and let all be healthy. We know health and happiness could be possible only if all the physiological systems of the body are in normal conditions. However, Modern lifestyles, environmental pollution, lack of physical exercise and stress have created a lot of negative challenges to our body to maintain its homeostasis. These conditions have led to many modern diseases like heart diseases, hypertension, diabetes, asthma, COPD, Cancer, depression and so on. Therefore, we physiologists and medical scientists have a challenge to 'redefine health in nature'. We need to do research and create awareness on these subjects to improve the quality of lives of the people and make them healthy and happy.

This conference could be a milestone in the field of physiological sciences in Nepal because many physiologists, doctors and scientists not only from SAARC countries but also from scientifically developed countries like USA, UK, Austria, Japan, Italy, Germany and so on are participating in this conference to discuss basic to recent advances in physiology and to use the results in our day-to-day lives.

In this fifth SAAP conference, the organizing committee has arranged the pre-conference and post-conference workshops besides the scientific sessions on neurosciences, other physiological systems, healthy lifestyle, sports physiology, yoga, meditation and high altitude physiology. We hope a country like Nepal could contribute a lot in the field of high altitude, lifestyle and wellness physiology in scope of research and its application are opened because of the presence of the highest mountain ranges in the world including Mt. Everest as well as spiritually oriented Himalayas, high altitude lakes, beautiful landscapes, rivers and waterfalls.

We are very much motivated and encouraged to receive many scientific papers and poster presentations in this conference. We believe and are confident that this conference will provide us meaningful outcome and stimulate the faculties and young scientists to do more research in this field of physiology.

We also want to express special thanks to Kathmandu University and Nepalese Army Institute of Health Sciences for their encouragement and extraordinary support. I, once again, thank and cordially welcome all of you joining this inaugural program and the conference, and wish you a comfortable and meaningful stay in Nepal.



Prof. Tara Man Amatya
Chairman, 5th SAAPCON - 2016
Kathmandu, Nepal

We express hearty thanks to the honorable chief guest, distinguished guests from home and abroad as well as to all the participants, guest speakers, our sponsors and media personnel.

Welcome Message from Associate Dean of Kathmandu University School of Medical Sciences



KATHMANDU UNIVERSITY SCHOOL OF MEDICAL SCIENCES



Message

Redefining Health in Nature is very appropriate, practical and thought provoking theme to address the science, evidence and future of medicine for life sciences. Physiology – the foundation of medicine, is important discipline for clinicians, academicians, researchers, allied health professionals and students. Bringing students and young professionals to experienced specialists in one conference will definitely expand the horizon of further development of science and art of medicine.

The history of medical education in Nepal is not long, however it has been significantly expanded in last 2 decades. The gathering of numbers of medical physiologists, scientists, academicians, clinicians, students in this conference is the witness of expansion of health science academia in Nepal. This confidence will further consolidate and expand the quality of medical education in Nepal.

As the research in basic sciences is at preliminary stage in Nepal, this is to believe that, this conference will open the possibilities of researches, networking and collaboration nationally and internationally. I congratulate Physiology Society of Nepal and South Asian Association of Physiologist for organizing this SAAPCON – 2016 and wish a grand success with significant conclusion and pleasurable events.

Prof. Dr. Rajendra K. Jha
Associate Dean
Kathmandu University School of Medical Sciences

Welcome Message from Organizing Secretary of SAAPCON-2016



It is our pride and privilege that we have got opportunity to organize the 5th Biennial Conference of South Asian Association of Physiologists (SAAPCON-2016) in conjunction with 2nd Annual Conference of Physiological Society of Nepal (PSN) at the Kathmandu University, Dhulikhel. We would like to welcome you all in Dhulikhel, a small city with full of scenic beauty of Himalaya and mountain ranges. It is in the east of Kathmandu. We owe our depth of gratitude to honorable vice chancellor of KU, Prof. Dr. Ram Kantha Makaju, and whole team of Kathmandu University School of Medical Sciences for praiseworthy cooperation.

We are organizing SAAPCON for the first time in Nepal. The decision to hold it in Nepal was taken in SAAP IV in Bangladesh. However, Nepal faced devastating earthquake, and political turmoil. While facing these challenges, continuous encouragement of our SAAP members and some improvement in country's condition, motivated us to initiate work to organize the conference. Faculty members of physiology from almost all medical colleges of Nepal served as the member of local organizing committee (LOC) and its sub-committees. All the members of LOC, worked hard to organize this conference. Today it has come true that we are ultimately gathered for the conference and the hard work and challenges we faced, have turned into amazing feeling of joy. I would like to extend our heartfelt gratitude to all members of our SAAP family and Advisory Board Members for their continuous encouragement, guidance and support. I would like to extend my endless gratitude to all members of LOC and sub-committees for their co-operation and tireless job for moving the conference towards a success.

In this conference more than 50 international invited speakers from different parts of the world including the USA, the UK, Japan, Iran, Saudi Arabia, Taiwan, Austria, and member SAARC countries: India, Bangladesh, Pakistan, Sri-Lanka, and Bhutan are going to deliver their speech in the Preconference Workshop on Learning of Physiology in 21st Century, two-day main Conference and the Post-conference Workshop. More than 100 international delegates are participating in the Conference and in its pre and post events and present their scientific research findings. It is our pleasure that it is going to be a big platform for academic and scientific interaction. We hope that the conference helps promote research in this region and others as well. We are proud of our distinguished speakers for accepting our invitation and all the participants coming for the event. We would like to extend our heartfelt gratitude to our all distinguished guests and participants and expect that there will be fruitful academic interaction and a memorable and joyful stay in Nepal.

No conference can be organized without fund. It is a big challenge. We extend our sincere gratitude to our international organizations: The International Union of Physiological Sciences (IUPS), The American Physiological Society, The Physiological Society of UK, The International Brain Research Organization (IBRO), AD Instrument, Australia; KU, Dhulikhel, Nepalese Army Institute of Health Sciences, Kathmandu, B.P. Koirala Institute of Health Sciences, Dharan and Makaulu Adventure for providing financial assistance and/or other support to conduct events of the Conference.

I would also like to extend our sincere gratitude to all the supporting staffs, other resource persons and volunteers. They helped us a lot for conducting this conference.

We look forward to your gracious presence for a memorable time in Nepal.



Dr Rita Khadka
Organizing Secretary
SAAPCON-2016, Kathmandu, Nepal
Additional Professor
Department of Basic and Clinical Physiology
B. P. Koirala Institute of Health Sciences,
Dharan, Nepal

Welcome Message from President of Neuroscience Society of Nepal



Registration No: 4139/071

SWC Affiliation No: 40905



Neuroscience Society of Nepal (NSN)

Estd. 2015

Letter: SAAPCON-16/072-73.....

Date: 10th November, 2016.....

It gives me immense pleasure to announce the initiation of Neuroscience Society of Nepal (NSN), a juvenile Nepalese organization of an academicians, neuroscientists and clinicians, who studied neuroscience (such as neuroanatomy, neurophysiology, neuropharmacology, neurochemistry, neuroimmunology, neurogenetics etc) involving the study of brain and nervous system and are actively involved in preclinical/ basic / clinical research and teaching learning activities in Nepal and abroad

After its conception in the early of last year, NSN is becoming one of fast growing and active organizations of its kind in Nepal. Last year NSN successfully organized the first historic IBRO (International Brain Research Organization) Associate School in February, brought various emerging neuroscientists as an IBRO lecture exchange program, organized its first annual meeting, involved in earthquake relief materials in several places in remote areas, and sponsored several talk programs and mini symposia. Under NSN support, several Nepalese graduate students have got opportunity to visit neuroscience laboratory abroad. In near future, NSN is organizing brain awareness week in community schools in Nepal in support of IBRO.

The main and sole objective of NSN is to promote research in any branch of Neuroscience in particular by dissemination of information, by arrangement of annual meetings, workshop, training and finally publishing journal. Being a non-profitable academic and corporate member organization of IBRO, we have academic responsibilities. In support of NSN, IBRO has provided financial support to **this 5th Biennial Conference of South Asian Association of Physiologist (SAAP) in conjunction with 2nd Annual conference of Physiological Society of Nepal (PSN), SAAPCON-2016** which is held in Kathmandu University from 10th to 12 November, 2016. .

On behalf of IBRO and NSN, I would like to cordially invite you all in this historic academic gathering of SAAPCON-2016 and wishing you all the grand success of events and pleasurable stay in Nepal.

Sincerely,

Dr Sunil Dhungel,
President, Neuroscience Society of Nepal (NSN)
Cell Phone: 977-9818884525, Email: sunildhungel@nsnnepal.org

Central office: Gwarko, Lalitpur Sub Metropolitan Ward. No 7; Email: neurosonepal@gmail.com; website: www.nsnnepal.org

SAAPCON-2016

10-12 November, 2016-Kathmandu University, Dhulikhel, Nepal

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Symposium 1: Neuroscience Symposium

Anatomical Diversity of Dendritic Spines in the Brain

Laxmi Kumar Parajuli

Department of Cellular Neurobiology, The University of Tokyo, Tokyo, Japan

Dendritic spines believed to be the locus of memory storage in the brain. Neurological diseases leading to an impairment in memory and cognitive capabilities are often associated with structural alteration of dendritic spines. Neuronal computation and higher order brain functions are different depending on the brain regions and are probably akin to the structural differences in the synapses (i.e.; dendritic spines). Thus, thorough ultrastructural studies of dendritic spines are necessary for understanding the basic neuronal computation and the etiology of neurological diseases. However, such studies have not yet been undertaken largely due to the inefficiency of conventional transmission electron microscopy methods. Fortunately, the recent development of focused ion beam/scanning electron microscopy (FIB/SEM) has opened possibilities to undertake such studies by automated, high-throughput serial section acquisition of a large volume of tissue. Here, using FIB/SEM, we imaged relatively a large neuropil volume from multiple spiny regions of the brain. By manual annotation of dendrites and their spines, we compare and contrast structural features of dendrites and their spines among different brain regions. Our findings suggest that there are several anatomical organizational principles of dendritic spines in the brain.

Modulation of Fear Extinction Learning by Thalamic Neurons

Touqeer Ahmed

Department of Healthcare Biotechnology, Atta-ur-Rahman School of Applied Biosciences, National University of Sciences and Technology, Islamabad, Pakistan

Fear extinction is a form of new learning in which the expression of a learned fear response is decreased after repeated exposure of conditioned stimulus. Fear extinction has been the base of general therapeutic process which is used to treat human fear disorders. The exact neural mechanism and the contribution of various brain parts in fear extinction learning are not fully understood. The mediodorsal thalamic nucleus has been implicated in the control of memory processes. We provided an evidence for bidirectional modulation of fear extinction learning by mediodorsal thalamic neurons. Mice deleted with phospholipase C- β 4 in mediodorsal thalamic neurons demonstrated impaired fear extinction. Phospholipase C- β 4 deleted mediodorsal thalamic neurons showed enhanced burst firing accompanied by increased T-type Ca^{2+} currents. Specific blockade of T-type channels in the in vivo conditions rescued fear extinction. Moreover, in-vivo single unit recordings during extinction demonstrated that the tonic firing frequency of mediodorsal thalamic nucleus neurons increased in wild-type mice, but was static in mutant mice. Tonic-evoking microstimulations of the mediodorsal thalamic nucleus during extinction tone trials rescued fear extinction in mutant mice. Based on these findings it was concluded that, firing patterns of the mediodorsal thalamic neurons are important for the modulation of fear extinction learning.

Cognitive Effects of Pesticide Poisoning and Drug Overdose: Challenges for the Neurophysiologists of Transforming South Asia

Tharaka Dassanayake

Department of Physiology, Faculty of Medicine, University of Peradeniya, Sri Lanka

Pesticide poisoning is a major clinical and public health problem in agricultural communities of South Asia. Organophosphates are the most commonly used pesticides in the region. Organophosphates act as cholinesterase inhibitors thus bring about acute neurological deficits in humans through widespread cholinergic overactivity. Our research in Sri Lanka over last ten years focuses on long-term neurocognitive deficits of organophosphates, a less known yet important entity. We employ neurophysiological (viz. cognitive event-related potentials) and neuropsychological techniques to assess the cognitive effects of these chemicals. The findings hitherto indicate both acute large-dose poisoning and subclinical occupational exposure are associated with long-term neurophysiological and neuropsychological impairment (Dassanayake et al., 2007; 2008; 2009). Further, our ongoing research indicates that hypoxia during the acute phase of poisoning increases the risk of long-term cognitive impairment. The impact of this impairment in day-to-day functioning of the victims is yet to be determined.

Our collaborative research in Australia focuses on the effects of sedative drugs on cognitive functions and driving. Sedative drugs, even in therapeutic doses seem to be associated with impaired driving and underlying cognitive functions, and increased traffic crash rates (Dassanayake et al., 2011). We also found that, when taken in overdose, these drugs have cognitively impairing effects that go beyond clinical recovery from acute poisoning (Dassanayake et al., 2012b; 2012c). Furthermore, these patients are more prone to traffic crashes at least up to 4-weeks following exposure (Dassanayake et al., 2012a), and the cognitive recovery over this period mirrors the crash risk at different post-exposure time points (Oxley et al., 2015).

As many regions of South Asia transform from traditional agricultural communities to urban industrialised societies, the pattern of poisoning changes from agrochemicals into pharmaceuticals, particularly psychotropic drugs. To this end, the two lines of research reported above highlight how the changing social fabric in the region poses new challenges for the neurophysiology researchers who study cognition and apply their findings in clinical settings. Generating age-, sex- and education-adjusted norms for the individual countries in the region would be an essential step in interpreting the cognitive test results of clinical populations.

A Call for Analysis of Yoga and Its Molecular Effects on Brain

Akshay Anand, Natasha Sayal

Neuroscience Research Lab, Department of Neurology, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Emerging studies have shown the positive effect of yoga and exercise on the physiological, biochemical, cognitive and molecular changes although additional controlled studies need to be carried out. The precise molecular mechanism underlying yoga, therefore, remains unclear. The nonpharmacological battery of yogic exercises, are proposed by Indian PM to be standardised through Quality Council of India, facilitating knowledge generation regarding homeostasis of the mind and body. As mentioned in the Taittiriya Upanishad (Gambhirananda, 1986), Indian vedic textual source, human frame has 5 bodies which are Physical, vital, mental, intellectual and blissful sheath. Yoga is effective in coping with stress, reduces anxiety and bring changes in the levels of neurotransmitters, regulation of the inflammatory molecules, thereby reducing the heart rate, maintaining systolic and diastolic blood pressure. Many characterise Yoga to 'zero budget assurance' for good health. Certain changes in the salivary proteosome etc. have also been documented through isolated studies. Despite these and various other studies, the exact mechanism underlying these changes remains unclear and unverified. Studies related to endurance exercises have provided indirect evidence documenting increase of neurotransmitters, Neurogenesis, Angiogenesis, Neurotropic factors etc. Increase in cognitive functions, delays in aging, altered gene expression, cell proliferation, cytokines secretion have not been comprehensively analysed or correlated due to challenges of a prospective study. As majority of these molecules participate in cell survival mechanisms it remains to be seen whether Yoga can modulate regeneration and strengthen repair system through cellular and molecular processes in larger cohorts using molecular tools. Nevertheless, with the launch of world's biggest yoga clinical trial by Patanjali Research Foundation, together with the advent of modern molecular techniques like microarray analysis, real time PCR analysis and whole genome sequencing, there is a growing curiosity to undertake studies which allow correlation of the genomic, proteomic and epigenomic changes in the blood of yoga practitioners. If such molecular studies are conducted on yoga practitioners, at various time points with long term clinical outcomes, it may reveal information relevant to cause and effect of yoga. Such studies need larger cohorts and compliance of healthy volunteers. In some retrospective studies Quigong practice and Sudarshan Kriya have been documented to cause molecular changes in blood cells by employing PCR and microarray analysis, in an effort to map the molecular changes, if any. However, the scientific rigour has always been lacking in majority of such studies. Ironically, these studies have either been undertaken by those who were formally not trained in molecular biology or those who had a cognitive bias against the utility of yoga as tool for preventive or curative healthcare. The latter insist that yoga studies should be limited to diseased subjects, ignoring the utility of T1/T2 translational loop. Interestingly, a study focused on endurance exercises in healthy volunteers has shown an increase in the pool of hematopoietic stem cells and endothelial progenitor cells in bone marrow as well as peripheral blood. However, the stem cell mobilization related markers or proteomic

analysis resulting from yogic breathing techniques, have been conspicuous by their absence. The Indian neuroscientists look forward to mapping the molecular, neuropsychological and pathophysiological basis of yoga and its effects.

Chronic Use of Carvedilol is Associated with Hearing Loss

Bandar Saeed Al Ghamdi, Dileep Kumar Rohra, Gheed Ali Ibrahim Abuharb, Hala Abdulrahman Alkofide, Nadiah Salem AlRuwalli, Mohamed M. Shoukri
College of Medicine, Alfaisal University, Riyadh, Saudi Arabia

Adrenoceptors AR are important targets in therapeutics. Competitive antagonists at β -AR are among the most widely used drugs in cardiovascular medicine. It has been shown that β 1-AR are present and functional in inner ear epithelial cells as well as in neuronal cells that are involved in auditory transmission. Beside the presence of β 1-AR in marginal cells, these are also present in outer hair cells, outer sulcus, supporting cells and transitional cells of vestibular labyrinth and in inner hair cells. If β -AR are present and functional in areas which are concerned with auditory system, then decreasing the function of those physiologically active receptors may result in defects in the hearing. Thus the current study was conducted to test the hypothesis that patients in cardiology department who are prescribed β -blockers will have a hearing loss compared to patients in the same department who do not receive β -blockers. The specific aim was to determine the association of use of β -blockers and hearing loss.

This was a cross-sectional study conducted on the patients visiting the Adult Cardiology Clinic or admitted at Heart Centre of King Faisal Specialist Hospital & Research Centre (KFSHRC), Riyadh, Saudi Arabia. All recruited study participants were divided into two groups based on their usage and non-usage of β -blockers. Group A were patients taking β -blockers and Group B were patients not taking β -blockers. Audiometry was performed on all the patients. A total of 212 patients were screened; however hearing test was performed on 151 patients. Out of those then 25 participants were excluded because of the presence of middle ear pathology. Therefore, the study population consisted of 126 patients. 68 patients were males (54%), and mean age was 40 ± 11.47 years. Sixty patients were on β -blockers (β -blocker group); and 66 patients were not on β -blockers (non- β -blocker group). There was no significant difference in patients' age, gender, and the presence of diabetes mellitus, hypertension or dyslipidemia between the two groups. However, cardiac failure and dilated cardiomyopathy were more frequent in β -blocker group. Accordingly, concomitant use of frusemide was significantly higher in β -blocker group, which is also an important drug for the management of these diseases. Audiometric analysis revealed that patients on carvedilol had significantly higher prevalence of hearing loss at almost all frequencies. Interestingly, other β -blockers like metoprolol and atenolol did not show any significant difference compared with non- β -blocker group. Concluding, this is the first study which shows that use of β -blockers on chronic basis is associated with some degree of hearing loss.

Neural Mechanisms Involved in the Sexual Dimorphism in the Rat

Arif Siddiqui

Barret Hodgson University, Karachi, Pakistan

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 revealing novel signaling pathways and cellular mechanisms. In the laboratory rodent it is well established that gonadal steroids act on the bi-potential brain during a perinatal sensitive period to permanently organize the neural substrate into a masculine or feminine phenotype leading to discernable sexually dimorphic functional patterns. What is 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 psychotropic drug on the developing brain are highly region specific. Recent studies highlights an unexpected role for psychotropic drugs in several brain regions in permanently altering the synaptic pattern of specific brain regions. Permanent sex differences in adult sexual behavior and neuro-endocrine function indicates that exposure to psychotropic drug morphine has a crucial role 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 neuro-developmental disorders including autism, schizophrenia, dyslexia and several neuroendocrine functions. By comparing and contrasting regional mechanisms we can begin to generate a unified view of how the brain is constructed to optimally serve the needs of each sex.

Physiological Characterization of Contextual Memory Trace in the Hippocampus

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The cognitive map theory, which assumes a representation of stimuli embedded within an allocentric spatial framework, has been highly influential in many neuroscience fields. Place cells are considered to be a strong candidate as a substrate for such locale representation. However, studies of place cells have been observational, and thus not been providing a causal link between their activities and recognition of space. The current study tests this assumption. In the study, we used c-Fos-tTA mice to label a subset of CA1 pyramidal neurons that becomes c-Fos positive during a novel context exploration. My previous work has shown that activity of the labeled CA1 cells is indispensable for contextual memory retrieval (contextual memory trace). To test if labelled CA1 cells are place cells, we conducted a multi-unit recording in freely moving c-Fos-tTA mice during a novel context exploration and optogenetically identified labelled CA1 pyramidal neurons. We found that not all place cells become c-Fos positive. In the talk, I will provide physiological characterization on c-Fos positive/negative subpopulations within place cells.

Regulation of Preoptic Area Neurons by Steroids/Oxytocin: Circuits and Behavior

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The olfactory cues initiate wide variety of neuroendocrine and behavioral responses. These behaviors are under the influence of sex hormones however some neuropeptides such as oxytocin and vasopressin plays pivotal role. Preoptic area, Medial amygdala, Cortical Amygdala are found to be involved in regulation of social behaviors. Lesion in different areas of brain found the involvement of preoptic area as a main regulating center and Oxytocin- a main neuropeptide. Oxytocin is involved in various social behaviors in mammalian species. However, oxytocin-deficient (OTKO) mice successfully accomplish reproduction although females cannot rear their pups because of lack of lactation. Though oxytocin is not essential for sexual behavior, it is still possible to have some role in mating interaction. In the present study, we employed alternate choice paradigm to assess odor preference to investigate the sociosexual behavior in two experimental paradigms; social approaching to sexual partner odor evaluated by an alternate choice paradigm, and direct social interaction in the semi-natural environment using OTKO mice of both sexes to determine the functional significance of oxytocin. In preference test, experimental mice were given a choice of two airborne odors derived from active male and estrus female, or active male and castrated male. The odors were presented by airflow through air-inlets on walls of the preference test apparatus, and time spent nose-poking into the inlet was recorded for 5 min to determine olfactory preference. Wild-type mice significantly preferred sexually active opposite-sex odor to the others, whereas OTKO mice showed vigorous but indifferent nose-poking to any odors. Following odor preference, the OTKO and wild type mice were placed with an opposite-sex individual in the semi-natural environment, and social interactions were tested. OTKO mice required significantly longer time to accomplish sexual behavior. We concluded that oxytocin plays an important role in regulation of sexual behavior, especially in a component of olfaction-related behavior, in both male and female mice.

Nutritional State and Neurocognitive Performance of Early Female Adolescents in Galle Municipal Area

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Background: Nutrition is crucial for cognitive development and female adolescents are nutritionally vulnerable due to specific reasons as onset of menarche, higher requirement for growth, changes in eating pattern, life style, and risk taking behaviors.

Objective: To determine the association of nutritional status with neurocognitive functions of early female adolescents.

Methods: Cross - sectional school based study was conducted on female adolescents (11 - 14 years, n = 200). Weight, height, waist and hip circumference were measured to assess protein energy nutritional status. Tricep, bicep and subcapsular skin fold thickness (SFT) were measured to assess fat mass. Neurocognitive function was assessed with Wechsler Intelligence Tests for Children (WISC), Tests Of Nonverbal Intelligence (TONI - 3) and computerized executive function tasks. Data were analyzed by comparison of means by one way ANOVA.

Results: The nutritional categories of the sample were, normal growth (N) (29.5%), underweight (UW) (62.5 %) and overweight (OW) (8%). Mean Processing Speed Index (PSI) was significantly differed between normal 99.60(SD ±12.0) and overweight groups 78.43 SD ± 41.7) ($p < 0.01$). Mean Working Memory Index (WMI) of normal, underweight and overweight group were 104.02 (SD ±12.0), 85.40 (SD ± 9.73) 92.75(SD ±11.24) respectively and working memory of underweight group is significantly lower than normal group ($p < 0.01$). Abstract reasoning and executive function (inhibition and visuo spatial memory) performances were not associated with nutritional state ($p > 0.05$).

Conclusion: Elevated BMI is negatively associated with processing speed and undernutrition is a risk factor for reduced working memory performances of female adolescents. Matured neural pathways in early delayed adolescence may contribute to the results observed in this population.

Validation of Sinhala Version of Mississippi Aphasia Screening Test (MAST)

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Background: Aphasia is an impairment of language due to focal brain lesions, which should be detected early to minimize disabilities affecting activities of daily life and quality of life. Mississippi Aphasia Screening Test (MAST) is a brief, screening tool to detect both receptive and expressive aphasia.

Objective: The aim of this study was to validate MAST which can be used by any health care professional as a screening tool to detect aphasia among Sinhala speaking patients.

Methods: A cross-sectional design was used for validation and cross cultural adaptation of MAST. A total of 53 subjects (23 stroke patients with language disorders and 30 healthy subjects) were enrolled. The MAST was tested for test-retest reliability, internal consistency, sensitivity and specificity. The study participants were assessed to detect aphasia using MAST, while Consultant neurologist's diagnosis was taken as the gold standard.

Results: Mean total score of the test group and control group was 45.00 and 97.73 respectively. The Sinhala validation of MAST had high internal consistency (Cronbach's alpha for test and control group was 0.997 and 0.914 respectively). The weighted kappa coefficient of agreement was 0.65, indicating a good agreement between the MAST scoring with Consultant neurologist's diagnosis. Sensitivity of the MAST was 0.73 and the specificity was 0.96. There was a significant difference between test group total score and the normal group total score ($p < 0.05$).

Conclusion: The Sinhala version of MAST is a reliable and valid screening test to detect aphasia among stroke patients.

Symposium 2: Cardiopulmonary Physiology I

Is Biological Repair of Heart on the Horizon?

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Mechanical repair of the heart is well developed over the decades. However, these are expensive to the extent that only a fraction of the population can afford this treatment mode. Therefore, the biological repair through the stem cell therapy is actively sought. There are individual cases and institutions where success is reported but generally the heart fix is elusive. The success rate is higher in animals than in human models. Treatment of experimental based heart failure with stem cells in animals shows promising results however, the stem cells clinical trials I, II and III show variable outcome depending on the endpoints of the study. The race of stem cell therapy is fierce. The biological repair, when it succeeds would be cost effective and easily accessible to fulfill the demand of public health. For this to occur, standardized multicentric study is needed after grasping the basic science mechanisms of stem cells. Which one of the mixes of stem cells might win the race is an open question. There are multiple basic science questions to be answered before the clinical success is guaranteed. It is envisaged that the victory of the stem cell therapy might be facilitated by the nano-medicine being on the horizon. Thus we need to follow the science as a light to serve humanity.

(Dedicated to the fond memories of Dr Naeem Jaffrey, founding Vice-Chancellor of Ziauddin University, Clifton Campus for nurturing faculty and students).

Transplantation of H9c2 Myoblasts Improves Ventricular Responses to Dobutamine Stress in Rats with Chronic Myocardial Infarction

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Therapeutic effects of progenitor cells on ventricular functions of infarcted hearts have been widely investigated in the past decades. Most studies assess the effect of cell transplantation on functional improvement of acutely infarcted hearts but not on chronically infarcted hearts. However, annual increases in chronic myocardial infarction require further development of secondary prevention strategies. Accordingly, the purpose of this study was to evaluate the effect of H9c2 myoblast on basal functions of infarcted hearts and dobutamine-induced cardiac function in chronic MI and explored its mechanism. In rats left anterior descending coronary artery ligation was operated to create MI. Two weeks after ligation rats were divided into two groups, including medium-injection group (MI) and H9c2 cell-injection group (MI+cell). Sham operation at beginning to be a control. The results showed that (1) in morphology, implantation of H9c2 myoblast attenuated LV mural thinning, hypertrophy and reduce infarcted area, thus prevented myocardial remodeling after myocardial infarction; (2) in ECG analysis, H9c2 myoblast transplantation reduced ST segment depression after myocardial infarction; (3) in cardiac function, the basic hemodynamics were no different among groups. H9c2 transplantation increased dobutamine-induced heart rate, LV systolic pressure and ventricular contraction that to the levels in the sham group; and (4) in molecular data, H9c2 transplantation reduced cardiac nerve hyperinnervation (tyrosine hydroxylase) and calcium-related protein expression (SERCA2a and calcium-activated potassium channel). Our present study proves that the application of H9c2 cell therapy improved dobutamine-induced ventricular function by regulating sympathetic nerve innervation and calcium handling protein.

Antiatherogenic Effects of Exercise Training

Josef Niebauer

Heart Center of the University of Leipzig, Germany

In randomized trials, regular physical exercise training has been identified to contribute independently to beneficial changes in the risk factor profile, retardation of the progression of coronary lesions and has been associated with a reduced rate of mortality. Therefore, in addition to comply with drug prescription, patients with coronary artery disease should further be motivated to include physical exercise into their daily routine. Although it has been puzzling how exercise training exerts antiatherogenic effects, underlying cellular and molecular pathomechanisms as well as their clinical implications will be discussed.

Insights into the Reliability of Heart Rate Variability

MMF Subhan

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Heart rate variability (HRV) is commonly and increasingly being used to assess cardiac autonomic regulation. Altered HRV has been proven to be a risk factor for adverse cardiovascular events, including sudden cardiac death. One of our concerns was using one five-minute ECG recording to measure baseline HRV and then comparing it with an intervention. We have reported a significant decrease in heart rate over three control occasions. This finding has gained importance in light of recent literature showing that heart rate can affect HRV; its influence can be removed through normalisation. Our aim was to investigate whether there was any effect of repetitive testing on normalised HRV in healthy subjects.

This presentation will cover some methodological aspects of measuring HRV, some common issues with measurement and how data can be normalised. Reproducibility data which has been collected on healthy subjects will be presented. An important finding from this data is that normalisation of data can alter results of the study, in relation to non-normalised data. We suggest that HRV investigators may need to make sure they have a stable baseline before giving subjects or patients any interventions.

Effect of Slow Breathing Exercise on Cardiac Autonomic Nerve Function Status in Male Patients with Type 2 Diabetes Mellitus

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Background: Type 2 Diabetes Mellitus (T2DM) may be associated with autonomic nerve dysfunction and reduced Heart Rate Variability (HRV). Regular practice of slow breathing exercise (SBE) improves cardiac autonomic nerve function activity and also increases HRV.

Objectives: To assess the effect of slow breathing exercise on cardiac autonomic nerve function status by analysis of HRV in patients with Type 2 Diabetes Mellitus.

Methods: This interventional study was carried out in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University from March, 2015 to February, 2016. For this, total 60 male diagnosed T2DM patients aged 45-55 years with disease duration of 5-10 years were included in the study group. The diagnosed patients were selected from the Out Patient Department of Endocrinology, BSMMU, Dhaka. Study group was again subdivided into two groups. Thirty (30) patients did not undergo SBE, only receiving medical treatment. Another 30 patients underwent SBE (30 mins twice daily) for 3 months along with medical treatment. HRV parameters were recorded at the beginning of 3 months and also at the end of 3 months of study period. For statistical analysis, paired and unpaired sample t-test were done as applicable. The P value of < 0.05 was considered as statistical significance. Results: In the group of T2DM with SBE, resting pulse rate, systolic and diastolic blood pressure, LF norm, LF/HF ratio were decreased significantly and SDNN, RMSSD, HF power and HF norm were increased significantly after 3 months of SBE. But all these parameters were not significantly changed in the group of T2DM without SBE.

Conclusion: Decreased parasympathetic nerve activity and increased sympathetic activity were observed in patients with Type 2 Diabetes Mellitus before SBE. However, this effect return to increased parasympathetic activity, decreased sympathetic activity with sympathovagal balance towards parasympathetic predominance were found after performing slow breathing exercise for 3 months.

Study of Level of Lipids (TG, TC, LDL, HDL) In Healthy Adult Population of Bangladesh

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Background: The prevalence of ischemic heart disease (IHD) has increased in most of the developing countries, including Bangladesh. IHD is one of the major causes of death in both developed and developing countries. An important marker of IHD is dyslipidemia. This include elevated level of triglyceride (TG) and total cholesterol (TC), lower level of High density lipid (HDL), high level of low density lipid (LDL). So, it is very important to know the lipid levels of a particular population for early intervention and prevention of IHD. Different national and international bodies have proposed a cut-off value for the different lipid components. Among these, the reference value proposed by WHO is accepted worldwide including Bangladesh. But these values possibly do not reflect the actual values for Bangladesh.

Aims and objectives: So, the present study was aimed to determine the lipid levels among the healthy adult population of Bangladesh.

Materials and methods: The cross-sectional study was carried out from July 2012 to June 2013 in the department of Physiology of Ibrahim Medical College, Dhaka, Bangladesh. The study subjects were apparently healthy individuals of Ibrahim Medical College's students and staffs. For all four lipid components 95th percentile value was calculated. From the four components of lipid profile, presence of one of the components beyond the cut-off value (as given by WHO) was considered as dislipidemia.

Results: In case of TG, for all subjects the value was 204 mg/dl which was 227mg/dl and 150mg/dl for male and female subjects respectively. This reflects that significant number of male volunteers had levels above the cut off value as cited by WHO. In case of total cholesterol the values were close to the upper normal limit level as most of the subjects had the value above cut off limit. In HDL-Cholesterol, the 95th percentile value for male was 54, for female 57, and for all volunteers as a whole was 57. This value was much higher than the corresponding mean value of WHO. Though, the LDL-c value was within the cut-off values.

Conclusion: The data revealed that most of the volunteers have hypertriglyceridemia, low HDL-c. Moreover dyslipidemia appeared to be markedly high among the study subjects. Therefore, the study concluded that these cut-off values are not comparable with the cut-off values provided by WHO, especially for TG and HDL. Probably because of socioeconomic and ethnic variation Bangladeshi population may have a different cut-off values for lipid profile. In order to get a clear picture, the number of study subjects needed to be expanded involving multicenter approach to circumvent the bias.

Cardiopulmonary physiology: Oral Presentation

Transient Effect of Slow Pace Breathing Exercise on Blood Pressure, Heart Rate and Pulmonary Function Tests

Tapas Pramanik, Prashanna Shrestha, Ratna Keshari Tako, Shristi Bajracharya, Anup Chalise, Rajan Pandit

Department of Physiology, Nepal Medical College, Nepal

Background: Manipulation of breath movement is defined as Pranayama. Slow deep pranayamic breathing is reported as one of the most practical relaxation techniques. The reports are scanty about the transient effect of a slow pace breathing exercise for short duration, on different cardiovascular and respiratory parameters in untrained sedentary volunteers.

Objectives: To evaluate the transient effect of slow pace Vastrika pranayama (respiratory rate 6/min; 4 sec inhalation, 6 sec exhalation) for 5 minutes on HR, BP, and spirometry in sedentary volunteers.

Methods: In healthy, non-smoker sedentary volunteers (n=25, age=18-25 years) heart rate and blood pressure was recorded by using a mercury sphygmomanometer following 5 minutes rest. After 5 minute, slow pace Vastrika pranayama the blood pressure and heart rate were recorded again using the same instrument. In another group (n=12, age18-25 years) pulmonary function tests were performed before and after the same exercise for same the duration using a spirometer (Spiro Excel Medicaid). Data was analyzed using SPSS 16.

Results: It was noted that after aforesaid breathing exercise, systolic (117.44mmHg vs112.88mmHg), diastolic(70.48mmHg vs67.52mmHg), mean blood pressure (85.97mmHg vs82.48mmHg) and heart rate (73.32/min vs67.72/min) decreased significantly. The same manoeuvre for same duration produced significant decrease in FVC (3.44Lvs3.11L), FEV1 (3.06L/s vs2.75L/s) and FEF 25-75% (4.90L/s vs4.27L/s). PEF (8.63L/s vs8.38L/s) also decreased but insignificantly. Some volunteers felt calm, some felt sleepy, some felt very light and calm.

Conclusion: Slow pace Bhastrika Pranayama (Respiratory rate 6/min) exercise resulted reduction in the heart rate, blood pressure (systolic, diastolic and mean), and aforesaid PFT values. The feeling of calmness and/or sleepiness, indicated parasympathetic dominance. It thus caused an activation of parasympathetic system and can be practiced to keep autonomic nervous system in balance, for mental relaxation and reduction of stress in daily life.

Effect of Respiratory Rate on Sympathovagal Balance

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Background: Respiration is the most consistent modulator of cardiac autonomic activity. The concept of "sympathovagal balance" reflects the autonomic state resulting from the sympathetic and parasympathetic influences. Studies have shown that sympathovagal balance enhances by slow paced breathing, but at higher respiratory rates it is not studied much. Therefore, the objective of our study was to observe sympathovagal balance at various paced breathing rates.

Methodology: The study was conducted in 24 healthy young adults aged between 17-20 years with no history of previous respiratory or cardiovascular illness. The simultaneous recordings of ECG and respiratory movements were done in resting condition, followed by the recordings during different paced breathing rates (6, 10, 15, 20 and 30 breaths/min) for 5 mins each. A human voice based instruction system was used for pacing respiration and inspiration and expiration duration was kept at a ratio of 1:1. The volunteers were not instructed to control or modulate the depth of breathing. HRV analysis was done for assessment of sympathovagal balance.

Results: The records with total power more than 2000ms² were analysed. The LF/HF ratio in frequency domain analysis in HRV showed the statistically significant difference across 6 respiratory rates ($p=0.004$). The spontaneous mean LF/HF ratio was 1.71 ± 1.04 . It showed enhancement as respiratory rate increased from 10 to 30 BPM (10BPM = 0.44 ± 0.38 , 15BPM = 0.93 ± 0.73 , 20BPM = 1.09 ± 0.89 & 30BPM = 3.95 ± 3.87) and was maximum at 6 BPM (mean = 6.94).

Conclusion: Paced breathing at higher frequency influences sympathovagal balance, with gradual increase from 10 BPM to 30 BPM. This physiological intervention could have therapeutic implications in autonomic modulation.

Effects of Shisha (Water Pipe) Smoking on the Lung Function Indices of the Youth of Karachi, Pakistan

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Background: Shisha smoking (also known as Water pipe, Hubble bubble, Arghile) expose our body to hazardous substances which may lead to many life-threatening diseases including lung cancer, mouth cancer and urinary bladder Cancer.

Objectives: The aim of this study is to assess whether there is any difference in the lung function indices of those who smoke shisha as compared to non shisha smokers.

Methods: 152 shisha smokers and 153 age matched non shisha smokers (between 18-35 years of age), who were all non-cigarette smokers and had no apparent lung diseases were recruited for this study. All subjects were volunteers and underwent screening with detailed history, anthropometry and spirometric measurements.

Results: There was a significant reduction in the force vital capacity (FVC) [mean difference (95% CI) 0.54L (0.45, 0.64) $P < 0.001$], force expiratory volume in first second (FEV1) [mean difference (95% CI) 0.52L (0.43, 0.61) $P < 0.001$], and peak expiratory flow (PEF) [mean difference (95% CI) 78.6L/min (65.2, 92.04) $P \leq 0.001$] in the shisha smokers as compared to the control individuals.

Conclusion: It is concluded from this study that shisha smokers had statistically significant lower FVC, FEV1 and PEF as compared to the non shisha smokers. Therefore, it is suggested that regulatory bodies should take necessary steps to prohibit the selling and smoking of shisha in public places as this would help in reducing the morbidity and mortality associated with respiratory complications secondary to shisha smoking in younger age group.

Anti-Atherogenic Effects of Dietary Mixture (Ginger, Garlic, Lemon, Apple Cider Vinegar and Honey) in Experimental Animal Models of Hyperlipidemia

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University of Karachi, Pakistan

Background: Cardiovascular vascular diseases are highly associated with increased mortality and morbidity. It has been established from several experimental studies that dyslipidemia is a prominent cause of CVDs whereas statins are the primary choice of intervention for treating dyslipidemia, but statins are not fully effective.

Objective: Present study aims to investigate the efficacy of dietary extract i.e. mixture of culinary spices (garlic, ginger), fruits (lemon, apple vinegar) and honey in experimental animal models of hyperlipidemia.

Methods: 24 rabbits of either sex were used in the study. They were equally divided into three groups (control, hyperlipidemic and treated). Group I animals administered with normal diet. Group II and III animals had 1gram butter fat per 100 gram of daily diet along with normal rabbit chow to induce hyperlipidemia for one month. After that group III animals received herbal extract with the ratio of 1 gram of mixture/100 gram of daily diet for 15 days. At the end of experimental period, blood specimen were collected and assayed for plasma lipid profile, AIP, glucose, ALT and glutathione.

Results: Results of present study showed that oral administration of herbal extract cause significant reduction in plasma triglyceride (TG) and very low density lipoprotein VLDL levels (TG- $P < 0.05$; VLDL- $P < 0.01$), plasma total cholesterol (TC) levels also decrease ($P > 0.05$) whereas plasma high density lipoprotein (HDL) and plasma low density lipoprotein (LDL) levels were increased ($P > 0.05$). Significant reduction in atherogenic index for plasma (AIP) ($P < 0.01$) observed. Plasma glutathione (GSH) increased ($P < 0.05$) whereas plasma alanine aminotransferase (ALT) and glucose levels were also changed but non-significantly.

Conclusion: Results conclude that dietary extract has cardio protective and anti-atherogenic effects devoid of any known side-effects in experimental animal models.

Subclinical Autonomic Dysfunctions in Cancer Patients: Role of Heart Rate Variability

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All India Institute of Medical Sciences, India

Background: Autonomic dysfunction is common and among one of the least recognized impairment in cancer patients like lymphoma, leukemia, carcinomas of lung, breast, ovary, prostate, testicles and pancreas. It is one of the significant causes of morbidity, mortality and affecting the compromised quality of life. Despite several recent therapeutic advances, these cancer patients face an increased risk of developing autonomic neuropathy along with treatment-related cardiovascular autonomic dysfunctions.

Objective: Assessment of cardiovascular autonomic functions to monitor the prognosis of the disease and side effects of chemotherapy on cardiovascular autonomic dysfunctions.

Methods: Total 46 patients of various cancers on cardiotoxic chemotherapy were assessed for Heart rate variability (HRV) and Pulse wave analysis (PWA). Data obtained were compared with aged matched controls by using statistical software for Time domain, Frequency Domain & Non linear analysis for HRV. Pulse transit Time, Crest time, decay time for PWA.

Results: and Conclusion: Parameters like SDDSD, RMSSD, SDNN, pN50, LF/HF ratio, Total Power, SD1 & SD2 were significantly lower in Cancer patients than controls ($p > 0.005$). PWA showed increase in PPT in patients than controls with altered other parameters. Thorough detection of subclinical autonomic dysfunction in cancer patients is of vital importance for risk stratification and subsequent management. As the cardiac regulation is dependent on non-linear deterministic system, the non-linear dynamics measures should be preferred.

Symposium 3: Cellular and Integrative Physiology

Cell Signalling, Vascular Integrity and Glucostasis in Rats Exposed to Chronic Intermittent Hypoxia - Role of Antioxidant (Vitamin C) and Calcium Channel Blocker

Kusal Das, India

(The abstract is not available at the time of printing)

Mitochondrial Physiology

S. Manjunatha, USA

Mitochondria are the powerhouses of a cell where the final oxidation of body fuels and efficient harnessing of the energy released occurs and the energy currency of the cells, adenosine triphosphate (ATP), is synthesized. They play a pivotal role in cellular function, not only as a major site of ATP production, but also by regulating energy expenditure, apoptosis signaling, and production of reactive oxygen species. As a result, the dysfunction of mitochondria, particularly in their metabolic activities, has been associated with many disorders, including metabolic diseases, cancers, and neurodegenerative diseases, as well as the aging process. Functional measurements of intact mitochondria either in situ or isolated from fresh tissues provide distinct information regarding the function of these. The process by which mitochondria are isolated from small amounts of muscle or liver or brain and the approaches used to assess mitochondrial oxidative capacity and other key components of mitochondrial physiology are increasingly being used in research but their application in clinical medicine, though important, has been very limited mainly because of limited exposure and experience of clinicians in understanding mitochondrial physiology, their functional assessment and the clinical implications.

Effects of Phytocompounds on Beta-Cell Viability and Function

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Background: In numerous studies polyphenolic phytoestrogens and flavonoids have been shown to exert antioxidant, anticarcinogenic, vasoprotective, or to ameliorate the metabolic state. Most of these studies focus on either long- or short-term effects of the compounds.

Objective: Our studies aimed at testing for acute and long-term effects of extracts of *Leonurus sibiricus* L. (LS; used in Traditional Mongolian Medicine to treat symptoms of diabetes mellitus type-2), of quercetin (a major constituent of LS extracts), and resveratrol on beta-cell viability and function.

Methods: Rat INS-1 and INS-1E insulinoma cells were used as beta-cell models. Membrane potentials (V_{mem}), voltage-gated Ca^{2+} (I_{Ca})- and ATP-dependent K^{+} -currents (I_{KATP}) and intracellular Ca^{2+} (Ca_i) were measured using patch clamp and time-lapse imaging. Cell viability, markers of apoptosis and insulin release were assessed by cell proliferation assays, flow cytometry and ELISA, respectively.

Results: Aqueous LS extract (500 mg/L) significantly increased insulin secretion and stimulated cell proliferation. Acute application caused V_{mem} depolarization and inhibition of I_{KATP} similar as tolbutamide (100 μ M), and induced a rise in Ca_i . Quercetin mimicked the acute effects of LS extracts, but strongly reduced cell viability at concentrations >50 μ M. Chronic resveratrol application (50–100 μ M) led to induction of apoptosis and cell cycle arrest in the S and G0/G1 phase. Acutely applied it terminated electrical activity and inhibited I_{Ca} , I_{KATP} and swelling-dependent Cl^{-} currents.

Conclusion: Since the stimulation of cell viability by LS extracts contrasts the inhibition of observed under quercetin, we conclude, that other LS constituents overrule the anti-proliferative/pro-apoptotic effects of quercetin.

The functional impact of cell volume regulation

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Maintenance and adjustment of an adequate cell volume (CV) is an essential and indispensable biological necessity. The ability of cells to precisely regulate and tune their CV is a general biological principle and highly conserved throughout evolution. This goal is generally achieved by changes in the intracellular concentration of inorganic and organic solutes, termed osmolytes, like e.g. ions, sugars, amino acids, alcohols or macromolecules. On the one hand, perturbances of the CV are counteracted by cellular import/export and/or formation/degradation of osmolytes. The processes by which cells regulate their CV back to the original set point CV after cell swelling or cell shrinkage are called Regulatory Volume Decrease (RVD) and Regulatory Volume Increase (RVI), respectively. Conditions affecting CV are e.g. osmotic challenges, transmembrane transport processes, metabolism, action of hormones, transmitters or mediators, endo/exocytosis or hypoxia, to name a few. On the other hand, changes in the functional state of cells frequently require the attainment of new set point CVs. This is likewise, at least in part, achieved by utilizing the mechanisms of RVD and RVI. Examples are cell division and proliferation, cell migration, phagocytosis or cell death – both necrotic and apoptotic. Regarding the plenitude and diversity of cell functions that demand for proper CV regulation, it becomes clear that deterioration of the CV regulating mechanisms are involved in and contribute to manifold patho(physio)logical conditions like inflammation, tumorigenesis, tumour invasion and metastasis formation, defective immune response, infection, metabolic disorders, disturbances of neuronal or cardiac excitation, inadequate hormone secretion or transepithelial transport pathologies. A few examples will be discussed in the given time of the talk.

Role of Functional Foods on Acetaminophen and Hypobaric Pressure Induced Oxidative Stress Related Uremic Male Rats

Dilip Kumar Nandi, Koushik Das, Shrabani Pradhan, Suchismita Roy, Animesh Samanta, Shreya Mandal, Arpita Patra

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The number of patients with chronic kidney failure increases by 11% Globally. Kidney transplantation and dialysis is opted by a very few kidney failure patients for effective treatment but these are very time consuming, expensive and not free from side effects and not curable. Therefore, there is a great necessity for an unconventional, affordable, sustainable therapy for kidney failure patients to keep them alive.

Hypobaric pressure and acetaminophen overdoses seems to be favorable with increased oxidative damage which could be the consequence of the increased activity of ROS generating and decreased activity of antioxidant system that ultimately results in uremia. The present study is aimed to evaluate the impact of ALA and probiotic supplementation on stress induced uremia considering different biochemical parameters like urea, creatinine, MDA, SOD, catalase, RBC and hemoglobin. It was noted that serum urea, creatinine, MDA both are increased in uremic group and decreases SOD and catalase level. Acetaminophen overdoses causes the formation of NAPQI that decreases the glutathione level and causes oxidative stress. Hypobaric pressure causes hypoxia induced damage to endothelial cells, activation of cytokines, chemokines and cell adhesion molecules may orchestrate the lung inflammatory response. It cannot be ruled out that reactive oxygen (ROS) and ultimately leads to oxidative stress injury. But above these values are resettled in treatment group and minimize the stress induced uremia. It has great societal impact on community people as it is an alternative, cost effective, affordable harmless therapy which can minimize the oxidative stress induced uremia.

Cancer Stem Cells: The 'Secret' Behind Breast Cancer Relapse

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Failure to eradicate cancer is as fundamental as mis-identification of the target. In fact, after an initial response to chemotherapy, many patients with locally advanced breast cancer have recurrence of drug-resistant disease. We observed that the residual risk of recurrence was higher in patients with 'acquired' chemo-resistance when compared with matched-pairs of un-treated patients. Recently evolved cancer stem cell (CSC) theory suggests the possibility of CSCs to be responsible for such relapses. Our results revealed that in breast cancer cell line, MCF-7, a small population of cells always fails to surrender even at the lethal doses of chemotherapeutic drugs. These drug-spared cells not only display self-renewal, tumorigenic, angiogenic and differentiation properties, but also exhibit 'stemness signature' - thereby confirming their identity as cancer stem cells (CSCs). These CSCs can even trans-differentiate into endothelial-like cells to initiate angiogenesis independent of VEGF. These in vitro results are in line with those in chemotherapy-treated breast cancer patients, where enrichment of aggressive CSC repertoire in resected breast cancer tissue is observed when compared with matched-pairs of un-treated patients. A search for the underlying mechanisms revealed that in response to genotoxic drug combination, pre-existing CSCs generate NF κ B-IL-6-dependent inflammatory environment which (i) imparts stemness in non-stem cancer cells (NSCCs), and (ii) up-regulates multi-drug resistance as well as migration potential in total CSC-population. Treatment with FDA-approved drug aspirin prior to chemotherapeutic regimen restrains acquired chemo-resistance by perturbing nuclear translocation of NF κ B in pre-existing CSCs, thereby (i) resisting cellular plasticity, i.e., NSCC to CSC conversion through NF κ B-IL-6 feedback loop, and (ii) sensitizing pre-existing CSCs to chemotherapy. Our study, therefore, reveals a hitherto un-explained effect of chemotherapy on breast cancer cells and presents aspirin as a new treatment strategy, in combination with conventional chemotherapeutics, for improving recurrence-free survival of breast cancer patients.

Intratumoral Immune Landscape: Immunogenicity to Tolerogenicity

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Immune system possesses distinct innate and adaptive branches which act in a collaborative way to eliminate neoplastic transformation. In spite of the presence of immune response, tumors develop spontaneously through different immune escape strategies. It has been demonstrated that dysfunction of the host's immune system is one of the major mechanisms by which immunogenic immune system becomes tolerogenic. This dysfunction includes but not limited to loss of effector-/memory-T cells, Th2 cell bias and T-regulatory (Treg) cell expansion. However, the molecules involved in these processes were not fully understood. We observed that tumor-shed various soluble factors play critical role in suppression of anti-tumor immunity. Adding to the knowledge of abundant T cell plasticity in terms of cytokine production our study identifies an IL10-producing FOXP3+ Treg cell population that contributes to IL10-dependent type-2 cytokine bias in breast cancer patients. The master transcription factor FOXP3 associates with multiple interatomic partners which include tolerance partners, epigenetic modifiers, and differentiation factors to execute Treg-mediated immunosuppression. Targeting FoxP3-interatomic partners by micro-RNA would be promising approach to prevent the Treg-mediated tumor immune evasion. In recent findings we have identified miR-325 that regulates Treg development and function by interfering 3'-UTR region of FOXP3 and FOXP3-associated interactome partners. Lentiviral-mediated miR-325 over-expression hindered Treg augmentation and substantially reduced tumor progression in tumor-bearing mice. Hence targeting miR-325 may boost anti-tumor immunity.

Profiling of Bacterial Communities and Characterization of Bacterial Role in Pathophysiology of Chronic Obstructive Pulmonary Disease Patients (COPD), Using Novel Molecular Techniques in Pakistani Population

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Background: It is hypothesized that bacteria are important in the pathogenesis of COPD and its exacerbation. Most bacteriological research in COPD has utilized culture based methods. Novel molecular approaches enable detailed evaluation of the airway micro biome that may better inform the role of bacteria in COPD.

Objectives: This project aimed to characterize the microbial community in COPD through assessment of serial bronchoalveolar lavage fluid (BALF) at various visits

Methods: Bronchoalveolar lavage fluid from 145 COPD patients was collected at multiple stable, at each exacerbation and recovery visit over 12 months. Real-time quantitative PCR (qPCR) was performed on BALF DNA using universal 16S gene primers and specific gene targets to quantify total bacterial load and the specific pathogens. In a subgroup of 30 exacerbating patients, 454 high-throughput pyrosequencing of 16S rDNA amplicons was performed at each of the 4 visits.

Results: There was a significant difference in total bacterial load during various visit samples but no specific pathogen was dominant between longitudinal stable and exacerbation samples. 454 pyrosequencing identified Proteobacteria, Firmicutes to be the dominant groups contributing >80% of the sequence reads at phylum level. Haemophilus, Moraxella, Nocardia lactobacilli, bifidobacteria and Streptococcus were the dominant groups at genus level.

Conclusion: Novel molecular approaches enable detailed evaluation of the airway micro biome that may better inform the role of bacteria in COPD. Molecular profiling helps us identify heterogeneity in the airway micro biome of COPD patients, it also provide pivotal information about role of bacteria during various stages of disease.

Vitamin D Receptor Gene (Fok1 and Bsm1) Polymorphisms and Risk of Breast Cancer in Premenopausal Females of Sindh, Pakistan

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Background: Vitamin D and its receptors have potential anti-carcinogenic effects and are thought to protect against breast cancer (BC) but epidemiological data have been uncertain. The 1,25-dihydroxyvitamin D₃ mediates its effects via binding to vitamin D receptor (VDR). A number of polymorphisms exist in VDR gene, some of which may alter the BC susceptibility. The two most common SNP in the VDR gene are Bsm1 and Fok1, have been paradoxically associated with BC risk. Fok1 regulates the transcriptional activity of VDR whereas Bsm1 may influence VDR mRNA stability.

Objectives: The aim of this investigation is to examine the association between VDR gene polymorphism and BC risk in premenopausal Pakistani women.

Methods: It is a retrospective case-control study, which included female BC patients (n= 191) and female healthy controls (n=319) were analyzed for two potential VDR gene polymorphisms, Fok1 (rs2228570) and Bsm1 (rs1544410). DNA was extracted and PCR-RFLP was done for genotyping. Statistical analysis was done using SPSS17.0 at p-value < 0.05. Hardy Weinberg Equilibrium (HWE), Chi square test and odds ratio along with 95% confidence interval was calculated.

Results: The VDR (Bsm1) polymorphism was associated ($\chi^2=26.337$; $p=0.000$) with an increased occurrence of BC. A significant risk was observed with bb genotype (OR=5.317; 95% CI=2.668-10.576). However, no significant association ($\chi^2=1.638$; $p=0.441$) was found between VDR (Fok1) and breast cancer among cases and controls.

Conclusion: Present study showed that VDR Bsm1 gene polymorphism may prone to develop BC. However the risk factors for BC susceptibility remain vague. Future large scale studies are required to integrate the genetic variation in VDR gene and its haplotypes with vitamin D status.

Symposium 4: Health and Lifestyle

Role of Complementary and Alternate Therapies in Chronic Debilitating Diseases of Global Epidemic Categories

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With the advancement of civilization many diseases are also increasing and they are making the life more miserable. This may be classed as a curse of advancement as a famous proverb "what is potent for good is also powerful for evil". "Metabolic syndrome" is one of these disorders. Researches around the globe suggest that people are involved with various forms of alternate medicine. "Yoga" is an Indian art of healthful living. It is a complete mastery of mind and emotions. "Meditation" provides deeper rest than even dreamless sleep. It is a state of "bekhudi" by sufis—the state of self immersion. "Music" has pharmacology of its own. It ranks number one stress buster. It does this through vibration of the body at the point where mind and the neuro endocrine system intersect at chakra points on the sushumna nadi, within the spinal cord. Recently WHO has recommended the invitation of programmes designed to use medical plants more effectively in the traditional health care system. "Tulsi" is considered to be highly sacred, medicinal having extensive application in the system of medicine. So "mind body therapy" is believed to bring about a stable autonomic balance and hypo metabolic effect and improve the biochemical and hormonal profile. So it is an adjunct therapy, a supportive measure, indeed.

Role of Pranayam in Health and Disease

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Yoga is the ancient science originated from India. The Indian Rishis and Spiritual Practitioners had practiced yoga for their inner realization and in the process they attained the integral health. They knew that yoga is for integral upliftment of mind, body and psychic. They lived for centuries without suffering from degeneration and diseases. Seeing, observing and analyzing the way of living these Rishis, we realized the importance of yoga in health and disease. Yoga is for promotion of health and prevention of diseases. The Hatha Yoga, which is mainly useful for keeping good health, consists of asana, pranayama, surya namaskar and kriyas. Among them, pranayama is considered to be the most beneficial for treatment and prevention of diseases as pranayama (the yogic breathing exercise) is directly linked to autonomic functions and many of the diseases are due to autonomic dysfunctions.

Pranayama is very useful for reducing the cardiovascular (CV) disease risk. Any factor that increases susceptibility of the individual to cardiovascular disease (CVD) is considered as a cardiovascular CV risk. The common CV risks include obesity, smoking, lack of physical activity, prehypertension, hypertension, dyslipidemia, atherogenic risks, insulin resistance, prediabetes, diabetes, retrograde inflammation, unhealthy diet, psychosocial stress and work stress. CV disease, hypertension and diabetes are more prevalent in Indian subcontinent and they account for 52 per cent of deaths and 38 per cent of disease burden as per WHO report on South East Asia Region (SEAR). Metabolic syndrome is an important determinant of CV risk. Till date, no systematic study has been conducted from SEAR nations for assessment and prevention of CVD.

The basis of pranayama in reduction in CV risks is derived from the fact that it attains holistic improvement of health through body (physical-physiological) – mind (psychological) homeostasis by primarily attaining autonomic (sympathovagal) balance. Irrespective of the etiology, sympathetic overactivity has been recognized as the main pathophysiologic mechanism in the genesis of CV diseases and metabolic syndrome. Sympathovagal imbalance owing to sympathetic overactivity and vagal withdrawal is reported to be the basis of many clinical disorders including CVD. However, the role played by vagal withdrawal has been under-reported. Improvement of vagal tone is the key to achieve stable homeostasis through sympathovagal balance. Therefore, practice of pranayamic breathing that aims at improving vagal tone and reducing sympathetic activity appears to be promising in the management of many common metabolic diseases such as diabetes, hypertension, obesity, cardiac problems and many non-cardiac diseases.

South Asian Perspectives of a Global Epidemic of Type 2 Diabetes Mellitus

Savithri W. Wimalasekera

The prevalence of type 2 diabetes mellitus (T2DM) is increasing world wide. The South Asian region is estimated to have a greater increase in incidence of diabetes than other regions by the year 2020 (WHO). Urgent measures are needed to maintain glycaemic control and prevent onset of complications amongst the existing diabetic patients. Furthermore measures to prevent the onset of diabetes among the general population are the needs of the hour to decrease the burden of diabetes in South Asia.

Several studies have revealed that poor glycemic control is seen among the majority of T2DM patients in the region. Qualitative studies conducted on diabetic patients, health care providers and family members of T2DM patients revealed unique information applicable to the south Asian region.

These studies provided strong evidence that adhering to glycemic control behaviors, such as doing diet control, engaging in regular physical activities, and taking diabetes medication, are key to achieving glycemic control among adults with T2DM. Social and cultural influences, which include support of family members, play a large role in maintaining sustained glycemic control behaviors, adhering to regular exercise and medication taking behaviour. Further ethnographic data from Sri Lanka revealed insight to the health beliefs and practices of T2DM adults. The major themes identified are : (i) gaining religious support (ii) changing food habits is a struggle (iii) exercising is challenging (iv) western medicine causes long-term consequences and (v) Ayurveda/traditional treatments can cure. These findings revealed unique, informative insights into socio-cultural worlds of the T2DM patients in Sri Lanka. These aspects could well be applicable to the T2DM patients in region.

Further, the frequency of neuropathy amongst T2DM patients is high. The Michigan neuropathy Index and the monofilament test could be used to detect neuropathy early. Poor foot care practices contribute extensively to diabetic foot disease resulting in serious debility and amputation of feet. Despite regular instructions provided at diabetic clinics, only 37% of the study subjects maintained good foot care practices in Sri Lanka. It further emphasises the need to regularly screen diabetic patients for neuropathy in diabetic clinics. The Michigan neuropathy Index and the monofilament test scores are cheap, reliable easily used tests which could be conducted by trained nurses to early diagnose neuropathy even in busy diabetic clinics.

The onset of diabetes in the region could be prevented by adopting the following measures. These are to promote healthy stress free life style, adopt healthy eating habits, maintain a regular daily exercise regime and promote mental well being by close family and social relationships.

It is a great challenge to attain the above outcomes for our peoples. However if our collaboration could achieve this end, South Asia would become a model health region to the entire world.

Effect of Yoga on Cardiovascular Autonomic Functions in Hypertensive Patients

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According to the WHO report 2014, raised blood pressure is estimated to have caused 9.4 million deaths and 7% of disease burden. If left uncontrolled, hypertension causes stroke, myocardial infarction, cardiac failure, and others. There is strong scientific evidence of the health benefits of lowering blood pressure through population-wide and individual (behavioural and pharmacological) interventions. It is reported that despite of long-term normalization of blood pressure by anti-hypertensive drugs, there exists autonomic dysfunction, thus, there exists disease burden and risk of death. There is continuous search for newer methods of therapeutics including yogic practices. It is reported that combined practice of yoga (meditation, asanas & pranayama), improves cardiovascular autonomic function, thus, decreases BP & even reduces the requirements of anti-hypertensive drugs or their doses. Both cardiovascular autonomic responsiveness to stimuli and cardiac autonomic modulation are found to be improved even after a short period of yoga practice, which is good for cardiac health. It reveals that yoga practice can have good impact on reducing risk factors for cardiovascular diseases.

Occupational Physiology in Informal World

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Occupational Physiology can be defined as an area of human factors and Ergonomics that deals with the physiological functions of the human body and their ability to cope with the stresses and strains associated with occupation. Occupational Physiology seeks to change the things to better match capabilities, limitations & needs of human being and to reduce their work related stress. The utility of this subject is to improve individual work performance and organisational productivity.

The world of informal sector is characterized by minimum personal relationship between the employer and the employee. A large number of work forces in Asia (85%) are directly involved in informal sectors, whereas among the other continents, Africa contributes 57% to informal work. The most of the employees are contractual or casual. The labour laws are mostly, not applicable in the informal sectors. There is lack of occupational safety & health awareness among them, which include, less attention to industrial hygiene, poor housekeeping & poor employee protection.

Moreover, this tremendous work force directly links with work pressure. Here, time is calculated as accumulation of money. Work and time will become the stress to these workers. Production has great importance than safety and health, so, human comfort is greatly neglected. A demand for investigation on health and safety is a common and genuine demand of informal sectors. In 2001, in International Labour Conference, the challenge for integration of Informal economy with formal economy was greatly discussed. We should include another challenge: the applications of work comfort in informal sectors.

Occupational Physiology can be applied for the improvement of informal worker health through the applications of health interventions. Improper work activities in informal sectors cause musculoskeletal disorders. These disorders can be prevented and productivity of concerned organization can be increased by the application of proper and low cost interventions.

Lifestyle and the Immune System

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Lifestyle is a set of attitudes, habits, tastes, religious and moral standards, economic level, etc., that together constitute the mode of living of an individual or a group of individuals. Lifestyle is the characteristics of inhabitants of a region in specific geographical, economic, political, cultural and religious context. Lifestyle clearly affects health outcomes, but the good news is that you can change your lifestyle. For example, 30 minutes of moderate physical activity each day can reduce your risk of a heart attack by up to 50%. Increasing your fruit and vegetable consumption can reduce your risk of colon cancer by up to 50%. SAARC region including India, Pakistan, Bangladesh, Sri Lanka and Nepal account for more than a quarter of the world's population. This region has rich cultural diversity and many shades of healthy and unhealthy lifestyles. Diet and lifestyle are major factors thought to influence susceptibility to many diseases e.g., SAARC region people are at greater risk of heart attack at a younger age than other people because of mainly the lifestyle choices. Some harmful lifestyle factors are more common in native South Asians than in individuals from other countries. Culturally higher body weight is not always perceived as unhealthy and may be viewed as indicating good health or higher social status. South Asians predispose to hypertension because of eating too much salt (sodium), being overweight and not getting enough exercise, as well as drinking too much alcohol and using tobacco. Traditionally, South Asian culture has not placed much emphasis on physical activity. There is a cultural reluctance to reduce the butter and milk content of foods. There is a strong hospitality culture. Most South Asian countries have a relatively low prevalence of HIV/AIDS until now. We will discuss the lifestyle factors such as diet, Exercise, Sleep, religious activities, stress at work place and at home, and Study habits of SAARC region people and their impact on the immune system.

Stress: A Mysterious Human Behavior

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Stress is defined as a state of tension that can lead to disharmony or threaten the homeostasis of body. A large number of exogenous and endogenous factors play their role in human stress. "It's not stress that kills us; it is our reaction to it" (Hans Selye). Stress is a state of psychological and physical tension produced when an individual perceives that they are unable to cope with the demands imposed on them by a stressor. The consequent state of tension can be adaptive (eustress) or maladaptive (distress)

Long lists of stressors are cited during the last 150 years by researchers. One thing common is the environment related global stress. The mass migration from urban to rural and struggle for the existence leading to the extremes of two world wars have put up a new scenario of stress. Fast expanding industrialization and electricity over the globe has created a massive change in the sleep behavior and sleep debit are main culprit leading to stress. Even jobs interviews and examinations are putting stress in the young community.

The physiological basis of stress involves a series of neural and chemical reactions meant for physical survival. Hundreds of studies explaining the basis of stress have been put in the literature. The basis of Physical, chemical and psychological stress have been thoroughly explored and put into literature. We are trying to focus the pathogenesis of the stress response mainly not on neuroendocrine changes but trying to put emphasis on cellular and subcellular response to stress. According to Russel J. Reiter (Physiology 29:325-333, 2014) circadian rhythm in the format of increased Melatonin secretions during REM sleep acts on cytochrome oxidases of mitochondria to decrease production of free radical and provides a strong weapon to fight the stress and related complications.

Final Message: "Man should not try to avoid stress any more than he would shun food, love or exercise" (Hans Selye).

Why Zebras Don't Get Ulcers: An updated guide to stress-related diseases, and coping (Robert M. Sapolsky)

Translational Prospective of Antioxidant in Changing of Lifestyle Diseases: An Enigma of Metabolic Syndrome

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Recent trends are alarming towards various metabolic diseases such as obesity, hypertension, diabetes, Insulin resistance, iron disorders, visceral adiposity, stroke, early menopause, depression, CVD, musculoskeletal disorders, NAFLD, COPD, renal dysfunction etc. Metabolic syndrome is a major global public health challenge due to constellation of interconnected physiological, biochemical, clinical and metabolic factors that altered the levels of glucose, HbA1C, glucagon, lipids or methyl glyoxal that increased the advanced glycation end products and releases the cytokines such growth differential factor -15 (GDF-15). The proinflammatory cytokines are also responsible for endothelial dysfunction, dysregulation of calcium channel and ultimately leads to hypertension, fatty liver, diabetes, kidney disease, coronary vascular diseases. Similarly oxidative stress generate the lipid radicals and activated to oxidize the LDL and allow recruiting more foam cells that damages the endothelial wall for atherosclerotic lesion. Evidence suggest that various biomarkers such as IR, Adipokines, anti and proinflammatory cytokines, pro and antioxidants, genetic polymorphism such as micronutrient SNPs, mitochondrial dysfunction requires to manage either by bio- scavengers or reduction of dietary fructose and probiotics. Multivariate analysis may provide the significant information with the association between age, genders, waist circumference, hypertension, insulin resistance. GDF-15 levels have some hidden relation to changes in body weight, waist hip ratio, BMI and HOMA IR. Changes in lifestyle and some drug treatments for metabolic syndrome may provide the significant information for selection of appropriate antioxidants with appropriate amounts. Translational approach could be better tool to understand the metabolic pathogenesis and also will help in designing of DNA base personalized nutrition. Therefore, due caution to the body (especially those present in foods) can be used and they should be encouraged as part of a nutritional lifestyle change. Thus, this will be part of the therapy for all diseases involved in metabolic disorders and quality of life can be improved.

Quality of Life and Associated Factors Among Physically Independent Institutionalized Elderly People in Galle District, Sri Lanka

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Background: The proportion of institutionalized elderly people has increased in Sri Lanka during the recent decades as a result of population aging and ongoing sociocultural changes. Although quality of life (QoL) is an important aspect in their lives, little is known about their QoL and associated factors in institutionalized elderly people in Sri Lanka.

Objective: This study was conducted to assess the QoL and associated factors among institutionalized elderly people in Galle District.

Methods: Study was conducted with 290 institutionalized elderly people in Galle District. The QoL was assessed via WHOQoL-BREF. Group differences were assessed through ANOVA, Independent sample t test and significant level was kept at $p < 0.05$.

Results: The sample comprised 68.3% ($n=198$) of females with mean age of 72.53 years ($+6.43$). Mean total scores of QoL and subscale scores for general, physical, psychological, social and environment domains were 53.29 ($+13.10$), 50.60 ($+16.23$), 57.72 ($+15.70$), 53.94 ($+15.61$), 47.50 ($+22.78$) and 56.69 ($+14.42$) respectively. The total QoL score and all five subscale scores were significantly higher among elderly who engage in group and leisure time activities, who had friends, sleep time more than 6 hours per day, had higher educational status and higher cognitive levels as assessed by Mini Mental State Examination while those who younger than 70 years of age and who were married had significantly higher mean scores in total QoL and in physical, psychological and environment subscales ($p < 0.05$).

Conclusion: Age, cognition, engagement in activities, having friends, sleep, educational and marital status were positively associated with QoL of institutionalized elderly people.

Effect of Yoga Intervention on Gastric Myoelectrical Activity in Patients with Crohn's Disease

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Background: The vagus nerve is involved in the control of gastrointestinal motility. A low vagal tone, as assessed by heart rate variability (HRV), as a marker of autonomic dysfunction is observed in patients with Crohn's disease (CD). Modulation of vagal nerve may improve the gastric myoelectrical activity in patients with CD.

Methods: Electrogastrograms (EGG) with water load tests (WLT) was recorded to determine gastric myoelectrical activity (GMA) in patients with CD using Biopac MP 150 recorder (Biopac, USA). In each case, the dominant frequency (DF), and the power ratio (PR) of the gastric slow waves were recorded along with gastrointestinal symptoms. Autonomic functions were modulated by yogic intervention (2 months) (asanas and Pranayam).

Results: In yoga group, there were 11 males; 8 females (35.05 ± 11.42 yrs). All the patients were in the remission phase of the disease, with CDAI score of ≤ 150. In the control group, there were 8 males; 9 females (34.8 ± 10.5 yrs). In control group, the resting DF was 2.02 ± 1.27 cpm, which remained same after WLT (2.06 ± 1.28 cpm; P > 0.05). In the yoga intervention group, the DF was 2.16 ± 1.15 cpm, which showed no changes after WLT (2.00 ± 1.24 cpm; P > 0.05). The change in DF and PR after 2 months of yoga intervention was insignificant in patients with CD.

Conclusion: This study adds to the currently scant literature on effect of yoga interventions on gastric activity for the patients with Crohn's disease. Although no effect was observed on gastric myoelectrical activity but patients reported an improvement in gastrointestinal symptoms.

Physical Activity Patterns at Six Weeks Postpartum Among Sri Lankan Mothers with a History of Gestational Diabetes Mellitus (GDM)

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Background: Physical activity (PA) during postpartum period carries more benefits than risks. PA interventions prevent progression of GDM to DM. Evaluation of baseline PA pattern facilitates planning appropriate interventions.

Objectives: To determine the baseline PA pattern and its associations at 6 weeks postpartum among Sri Lankan women with a history of GDM.

Methods: This cross sectional component, which is a part of a prospective study was conducted in three districts of Sri Lanka. Pre-tested short version of International Physical Activity Questionnaire (IPAQ) was administered to GDM mothers (n=100) at six weeks postpartum. PA was assessed by IPAQ scoring protocol. Associations and correlations were assessed by Chi square and Pearson correlation tests respectively by SPSS. Ethical approval was obtained from Ethics Review Committee, University of Sri Jayewardenepura.

Results: Mean age(\pm SD) was 33.6(\pm 5.8) years. 52% were para 2 and 35% were employed. The mean(\pm SD) BMI was 25.99(\pm 4.67) kg/m². The mean(\pm SD) weekly total MET-minutes of PA was 6364.3(\pm 6861.4). Of the sample, 53.0%, 20.0% and 27.0% were in health enhancing physical activity (HEPA), minimally active and inactive groups respectively. Walking was the commonest PA in HEPA group. Significant associations and weak positive correlations were seen between PA and, parity ($r=0.204$; $p=0.042$) and number of dependents ($r=0.222$; $p=0.026$). However, education, employment status, income, family history of diabetes and BMI did not show any significant associations with PA.

Conclusion: About half of the sample was highly physically active. Only one fourth were inactive. Walking is the most popular mode of PA. PA increased with increasing numbers of offspring and dependents.

Symposium 5: Role of Physiology and Medical Education

Plagiarism in Biomedical Research and Its Consequences: Role of Professional Associations

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Background: The paper discusses about plagiarism in biomedical research, different types of plagiarism and their consequences.

Objectives: The objective of the paper is

- i. To highlight the basic principles of biomedical research ethics.
- ii. To increase awareness about different types of Plagiarism, plagiarism detection softwares, prevention and consequences of plagiarism.
- iii. To suggest the role of Biomedical Associations in these respects.

Methods: Information on plagiarism in biomedical research and on related methods have been obtained from various published sources, ethical codes, policies, guidelines/Declaration adopted by universities, Research Organisations/Institutions/Professional Associations etc. of different countries.

Results: A. Some common forms of plagiarism, recently identified, have been mentioned eg.

- i. Downloading a free research paper.
- ii. Buying a paper from a commercial firm.
- iii. Copying an article from the web or online electronic database.
- iv. Copying a paper from a local source.
- v. Cutting/Pasting to create a paper from several sources.
- vi. Quoting less than all the words copied etc.

B. Some plagiarism checkers/Detection softwares like

1. i-Thenticate
2. Turnitin
3. Viper
4. Urkund etc have been mentioned.

C. Some proposals for avoiding plagiarism have been suggested.

D. A case study of plagiarism has been mentioned as an example.

Conclusion: The role of professional Associations in respect of increasing awareness of Plagiarism in Biomedical Research have been suggested.

IUPS Outreach Mission with a Focus on Strategic Research Domains

Jayasree Sengupta

Chair, Board of General Assembly

International Union of Physiological Sciences

Former Professor and Head of Physiology

All India Institute of Medical Sciences, New Delhi, India

Nearly 450 years ago, Jean Fernel, one of the foremost figures of French Renaissance science and medicine was the first to coin the term 'physiology'. In the three volume treatise, *Universa Medicina Physiologia* comprising *Physiologia* along with *Pathologia* and *Therapeutice*, Fernel established the foundations of the theory of operation of the human body. We are now attempting to trace back to these roots in examining the functioning of the human body through the viewports of closely interlaced networks of genes, proteins, interactive metabolic and signaling pathways at individual cell and tissue levels, and in the organism as a whole. It is a challenging and indeed a daunting task before us. This Systems Biology approach heralds a new era which is gyroscopic yet offers a holistic approach towards understanding the fine tuning of how our body performs in health and disease states. The Physiome Project of the International Union of Physiological Sciences (IUPS) is one challenging area which brings together scientists of various disciplines in developing multi-stage and multi-level complex network models to delineate how the body functions and to develop through such models biomarkers of health and disease.

One focused strategy of the Board of General Assembly (BGA) of the IUPS is to engage with younger physiologists and to gauge their opinions and requirements necessary to take 'Physiology to the Centre Stage' in this part of the globe. At the 2011 Annual Meeting of the Association of Physiologists and Pharmacologists of India (APPI) there was a brainstorming session on 'Vision: APPI 2020' that led to a resolution of 'mentoring' young and aspiring scientists and teachers towards a research career and thus help to facilitate the development of human resources in physiological and pharmacological sciences in India. The Indian Council of Medical research (ICMR) with the support of the IUPS had graciously supported a core group of senior scientists as Mentors to conduct three Mentor-Mentee Workshops for the Advancement of Physiological Sciences (ICAPS) in India.

Beginning June 2013 to December 2013, forty seven (47) young faculty/scientist mentees from medical colleges, universities and research institutions across India participated to present their research pre-proposals that were thoroughly debated and discussed from all angles in the three workshops. Twenty four (24) faculty and scientist mentees were selected to prepare their full proposal under the guidance of their respective Mentors and several of these have now been funded. The take-home message from both the mentees' and mentors' perspectives was that this form of mentoring from the pre-proposal stage to the full proposal format provided a unique experience in synergy of learning. We espouse that an initiative was thus taken to fulfill the three pronged strategy of ICAPS in enhancing national capabilities in biomedical research; recognizing excellence in research in physiological sciences; and in inspiring the next generation in the Indian scenario.

Employing mentor-mentee model along with 'hands on' workshops for technology transfer, we as physiologists of South East Asia can function as catalysts in a scientific revolution through a systems biology approach to vitalize key areas of health concerns that affect our population and societal development. These areas may include among others, research in fetal origins of adulthood diseases and the development of intervention strategies, research in cardiovascular diseases with focus upon novel prevention and management strategies towards patient outcomes in terms of mortality and functionality, and the integration of endocrine research including sexual and reproductive health care research with the impact of changing environmental scenario.

PBL Pathophysiology Improves Vertical Integration in a Traditional Curriculum- An 8-Year Rolling Study

Mei-Ling Tsai

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A 7-year medical program has been implemented in Taiwan since 1949. The major turning point in the past decade which causes critical changes in medical curriculum is associated with the establishment of Taiwan Medical Accreditation Council (TMAC) in 1999. After on-site visits, TMAC has identified a key problem of vertical integration in our medical curriculum. To enhance clinical reasoning skills and application ability of basic to clinical sciences, a new course "problem-based learning (PBL) Pathophysiology" was introduced to Year 4 medical students. An 8-year rolling plan was designed to improve the quality of the PBL course. Meanwhile, a prospective study was conducted to assess if the PBL course improves the integration between preclinical and clinical medicine. We collected the upon-graduate surveys of the graduating classes from 2004 to 2011 who took the PBL course and filled the course survey in 2001- 2008 . The scores of student perceptions on PBL were increased over 8 years with continuous improvement in PBL cases and tutor's guide. Pearson's regression analysis showed a positive correlation between effectiveness of PBL and the integration between preclinical and clinical sciences, suggesting an important contribution of modified PBL Pathophysiology to the enhancement of the integration between pre-medical and clinical sciences.

Transforming Medical Physiologist Workforce: One More Way to Women Employment and Empowerment in Bangladesh

Shah Abdul Latif, Qazi Shamima Akhter, Sultana Ferdousi

Background: Prerequisite and priority of medical physiologist workforce in developing countries like Bangladesh is progressively increasing both in public and private sectors. First formal medical education including physiology started in 1948 with limited medical physiologist workforce in Dhaka medical college. Outstanding growth of public private medical institutes now is in a progression.

Objective: To analyze & express the gender and ranking status of medical physiologist workforce in Bangladesh.

Design: This is a cross sectional qualitative study based on secondary literature survey with professional background.

Setting: Medical physiologist workforce serving in public and private sectors; enlisted in the member directory of the Bangladesh society of physiologists.

Measurements: Gender and number of medical physiologist workforce in the year 2006, 2009, 2012 and 2013 (January) and changes of gender and number of medical physiologist workforce in these years.

Results: From 2006 to Jan 2013, liner increment of total number and gender of medical physiologist workforce were observed. Amazing transform watched on feminine direction [men = +73.17%; women = +98.51%].

Of a total 204 medical physiologist workforce, women led to statistically significant number compared with men (men 71 [34.8%], women 133 [65.2%]; Z test $P < 0.001$). In the rank and position of professor, associate professor, assistant professor & lecturer; the number of women is dominating, with characteristics in assistant professors (men 17 [21.8%], women 61 [78.2%]; Z test $P < 0.001$).

Limitations: Member directory updated by the office staff, not by the members of the Bangladesh society of physiologists and overseas migration of members.

Conclusion: Findings suggest that, there is transformation towards increased trend of women medical physiologist workforce employment and empowerment in public and private institutes to teach medical physiology in Bangladesh.

Role of Physiologists in Health Care System

Ali Muhammad Soomro

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Deviation in physical, mental and social comfort attract many scientists including physiologists that pave a way towards advances in the biomedical sciences. The physiologists play vital role by integration approach towards clinical practices and the normal physiological wellbeing. Therefore they emphasize on searching how one normal organism do function from a small cell to complex body structure, and execute activities like sitting & lying, standing & walking, breathing in & breathing out, drinking & eating, digesting & excreting, sleeping & wakening along with the responses, controls and reproduction. Job done by the physiologists proved the "Physiology a basis of medicine", due to their role helping others develop the new ways and procedures for handling the deviancy to normalcy of health. Physiology as a basic physical health discipline is a key to the biomedical and clinical practice, and plays a main role in understanding the concepts of health and disease. Therefore the physiologists are described to work at various institutions of medical and allied medical sciences, and teach the physicians of tomorrow for better health care at primary, secondary and tertiary level. Overall, physiologists assess, diagnose, and treat the health problems linked to physical and mental health. Additionally, physiologists play a significant role in the prevention of diseases, and promotion of human health with quality of life.

Advancement of Physiology in South Asia

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Physiology means functions of life. The goal of Physiology is to explain the physical and chemical factors that are responsible for the origin, development and progression of life. Each type of life from the simple virus to the complicated human being is the field of physiology. Therefore the vast field of physiology can be divided into viral physiology to human physiology and so on. The history of physiology so much ancient as life or human civilization.

Where there is life there is Physiology, No Physiology no Life. It is the reality. Homeostasis is the beauty of physiology and Physiology is the mother of modern medical science. Start of life up to death is within physiological range. Any deviation from Physiology is the sickness, disease or Pathology. Severe deviation from Physiology, which is not returnable, is death. Target of all branches of medical science is to return back to Physiology and to maintain healthy life.

Practically development of physiology started in the ancient India, Egypt and later on Europe, America. Jean Fernel, a French physician introduced the term "PHYSIOLOGY". In 19th Century, Physiology began to grow rapidly. Claude Bernard, also a French physiologist, discovered the milieu interieur. This "milieu Interieur" is taken up as "homeostasis" by American physiologist Walter B. Cannon in 1929. Development of Physiology in the world and South Asia is a big and complicated history. The Physiological Society was founded in London in 1876. The American Physiological Society was founded in 1887. The role of physiological societies play an important role in the advancement of physiology.

The South Asian Association of Physiologist (SAAP) was established in 2007 in Islamabad Pakistan by a group of physiologists from SAARC countries is a great step in the history of advancement of Physiology. It is a non-profit professional organization committed to the advancement of physiology from basic research to clinical applications. It consists of more than 1000 members from India, Pakistan, Bangladesh, Sri Lanka and Nepal. SAAP conference was rotated successfully in India, Sri Lanka, Bangladesh and fifth one is waiting at Nepal for the further development of Physiology in South Asia. Now it is the time to include all the South Asian countries in to SAAP.

The trend of theoretical physiology based on book knowledge mainly. Our education system puts maximum of its effort on this aspect. Application of physiological knowledge in clinical practice is unfortunately poorly developed. Practical physiology should be well structured and well tested in our education system. Although the importance of physiology is appreciated by all medical professionals, still it is lagging behind. Though South Asia gave birth to the concept of Physiology but still we are not much advancing in the development of physiology. Our learning and teaching methodology must be

improved. Comparatively western countries are reaching new heights in advancements in Physiology. We, the physiologists, with all our knowledge, are passing it to the next generation. We have to utilize those 3 different aspects of physiology into use. To do that, we have to create researchers and scientists to various sections of physiology. We have to create specialized post-graduate program like Cardio-Physiology or Respiratory Physiology. We give them enough exposure to clinical and practical sector. To do that one need to have direct contact with patients and access to various test results. We must establish Physiological laboratories like pathological or biochemical Labs in all hospitals. We can do all the organ function tests. We will advance and write newer chapters in physiology.

To What Extent is the First Year Academic Performance in Physiology Associated with the Final MBBS Examination Results?

Atapattu P M

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Background: Physiology is considered the basis of medicine. Most physiology is learned in the first year, and few students consciously apply the physiology knowledge in the clinical years. Students are likely to be more interested in learning physiology in the first year, if they know how much the preclinical physiology influences the final MBBS examination results. This study aimed at identifying the relationship between the first year academic performance in physiology and the final MBBS examination results.

Methods: The first year summative assessment results were correlated with the final MBBS examination results of one batch of medical undergraduates, using Spearman's rank coefficient. Ethics approval was obtained from the Ethics review committee, Faculty of Medicine, University of Colombo.

Results: 150(of 203) students consented to participate. Most were successful at the final MBBS examination in their first attempt with 1(0.6%) first class, 15(10%) second class upper division, 60(40%) second class lower division and 52(34.6%) simple passes. 22(14.6%) failed. Final MBBS results showed significant correlations ($p < 0.01$) with end-of-first year examination total ($r = 0.608$) and physiology total scores ($r = 0.664$). There was a similar significant association ($p < 0.01$) with all physiology continuous assessments [1st($r = 0.590$), 2nd($r = 0.580$) and 3rd($r = 0.621$)] and all examination components in physiology [multiple choice questions ($r = 0.601$), structured essay questions ($r = 0.564$) and objective structured practical examination ($r = 0.464$)]

Conclusions: First year academic performance in physiology, at all components of the summative assessments is strongly associated with final MBBS results. Encouraging students to have a good knowledge in physiology in the first year may improve final MBBS results.

Symposium 6: Endocrine and Reproductive Physiology

Molecular Mechanism of Environmental Goiterogens on Thyroid Function in South Asian Region

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During post salt iodization phase, in spite of adequate iodine intake, goiter and associated iodine deficiency disorders (IDDs) are still prevalent in many geographical areas of Southeast Asian region possibly for the consumption dietary goitrogens / antithyroidal substances. Goitrogens are found in plant- foods of cyanogenic origin as well as in flavonoid containing plant -foods and water in which the people are exposed throughout their life cycle. As a result of salt iodization iodine intake of the people of northeast India is adequate/rather increased however endemic goiter and associated disorders found prevalent not for iodine deficiency but for the consumption of certain foods which are rich in cyanogenic constituents that are metabolised to thiocyanate that interferes with the uptake and utilization of iodine in the thyroid gland at different stages of thyroid hormone synthesis. Bamboo-shoot is one such food generally consumed by the people of north east throughout the year. In our earlier studies we have explained the role of dietary goitrogens in bamboo-shoot on thyroid gland function in vivo. In this study, the molecular and cellular mechanism by which goitrogenic constituents of this plant food affects thyroid gland function has been investigated.

Bamboo-shoots consumed by the people of northeast have been collected followed by its extraction, isolation and characterization of the cyanogenic / goitrogenic constituents. The purified extract then exposed to thyroid follicular cells in culture at different doses to determine IC50. Then in the cultured thyroid cells MTT viability assay as well as the generation of reactive oxygen species were measured followed by western blotting of the two important regulatory thyroid hormone synthesizing elements namely NIS and TPO have been studied. The results thus obtained explained in the light of the available literature. Besides bamboo-shoots the cellular and molecular mechanism of other goitrogens including iodine in excess in thyroid cells are in the process.

Effects of Mixed Exposure to Heavy Metals on Spermatogenesis

Sharaine Fernando

(The abstract is not available at the time of printing)

Endometrial Receptivity Toward Blastocyst Implantation in the Primate

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The physiology of endometrial receptivity to blastocyst implantation in the primate involves complex control process. Progesterone is sine qua non for blastocyst implantation in the primate and it executes the top-down control of functions to prepare the endometrium for embryo implantation during the mid-luteal phase of menstrual cycle. On the other hand, developing embryo in the bottom-up way manages to execute cross-talk with implantation-stage endometrium to establish functional synchrony between the two interacting entities: embryo and endometrium. This notion is corroborated by the observed loss of endometrial maturation in the absence of viable embryo. Using the model of relative progesterone starvation with and without viable embryo in the uterine lumen, we have performed multi-parametric analysis of the endometrium of the rhesus monkey to undertake a middle-out exploration of relative contribution of progesterone, vis-à-vis, embryonic inputs at the expression level towards endometrial receptivity for embryo implantation.

Applications of Chronomedicine in Health and Disease

Meenakshi Sinha

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The ubiquitous persistence of rhythmicity in almost all known variables of our body makes its presence one of the requirements for assessing viability, with circadian rhythmicity (CRs) being most conspicuous. Therefore, not only that a sound rhythm ensures health (as seen in jet-lag, shift workers) but also disturbance in CRs have been repeatedly linked to various diseases eg. hypertension, insomnia, diabetes, cancer, neurological disorders (autism etc.). These evidences have paved path for the potential and happening clinical branch, chronopharmacology and chronomedicine, with melatonin (the chronobiotic) functioning as a very vital cornerstone, dealing with time specific treatment of pathological symptoms by entrainment of variables. In this context, the branch of chronomics (mapping of time structures i.e. chronomes/ time structure of each pertinent variable in & around us) have evolved which finally deals with the computer analysed elements of variability creating a database for their clinical applications in health and disease.

A Rarely Existing Natural Sugar, D-Allulose Prevents Obesity and Progression of Diabetes in Type 2 Diabetes OLETF Rats

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Background: Prevalence of global obesity has risen and the condition most strongly influenced by obesity is type 2 diabetes which is a major threat to global public health. Excess calorie intake including unhealthy diets and sedentary lifestyles are mentioned the associated factors. This situation warrants attentive consideration of alternative medicines that provide better protection with lesser side effects.

Objectives: Recently, we have developed a zero-calorie sweet-taste monosaccharide, D-allulose which is named rare sugar since it's availability in nature is very rare, and is being synthesized through enzymatic conversion from the mixture of natural sugars in Kagawa University, Japan. D-allulose has been evaluated as a unique metabolic regulator against high blood sugar and high lipid.

Methods: OLETF rats, type 2 diabetes model, fed 5% D-allulose where control OLETF and healthy control, LETO were fed water. Body weight, food and drink intake, blood glucose and insulin were measured. OGTT was performed. Organs were preserved and stained.

Results: 5% D-allulose fed for 60 weeks significantly maintained body weight ($p < 0.01$), blood glucose ($p < 0.05$) and insulin ($p < 0.05$) levels than control rats. Oral glucose tolerance tests also showed significant reduction ($p < 0.01$) of glucose rise by D-allulose at 30 and 60 weeks. D-allulose significantly reduced both body fat levels ($p < 0.5$) and abdominal fat accumulation ($p < 0.01$), and also markedly attenuated progressive β -islet fibrosis evaluated by HE, Masson's trichrome staining and immuno-staining for insulin, glucagon and β -smooth muscle actin. Serum pro- and anti-inflammatory adipocytokines were also controlled well.

Conclusion: Rare sugar D-allulose might be a promising strategy for the prevention of obesity and the commencement and prevention of T2DM.

Impact of Kisspeptin on Hypothalamo-Pituitary Ovarian Axis in Treatment of Infertile Couples

Rehana Rehman, Zehra Jamil, Syeda Saddia Fatima, Sara Arif, Faiza Alam
Aga Khan University, Karachi, Pakistan

Objectives: To relate serum Kisspeptin levels with pregnancy outcome after intra cytoplasmic sperm injection (ICSI)

Methods: In the cross sectional survey carried at Australian Concept Infertility Medical Centre from June 2014 to June 2015, 176 females with 20 to 42 years of age and with regular menstrual cycles were included for ICSI. Patients with uterine fibroids and metabolic disorders were excluded. Down regulation of ovaries was followed by controlled ovarian stimulation, ovulation induction, oocyte retrieval, microinjection and embryo transfer. Serum samples for estimation of Kisspeptin, was done on OI day and endometrial thickness was measured. On the basis of beta hCG results were categorized into groups; A, non-pregnant with beta hCG <25 mIU/ml, and group B, clinical pregnancy with beta hCG >5 mIU/ml.

Results: Kisspeptin levels were significantly higher in the Group B versus Group A ($p < 0.001$) independently associated with positive pregnancy ($r = 0.388$; $p < 0.001$), and endometrial thickness ($r = 0.294$; $p = 0.05$) irrespective of the age and BMI of the subjects.

Conclusion: Kisspeptin is a positive pregnancy marker in females after ICSI as a result of its effects on oocyte maturation and endometrial thickness.

Estimation of Serum Copper Level in Benign and Malignant Prostate Disease and Correlation with Acid Phosphatase

Navaid Kazi, Sumayya Kazi, Arsalan Ahmed Uqaili
Isra University, Hyderabad, Pakistan

Objectives: To estimate and compare the serum copper level in patients with benign prostatic hypertrophy and prostate carcinoma and their correlation with serum acid phosphatase.

Methods: Study design: Case control study. Place of study: Postgraduate laboratory, Isra University / Diagnostic and Research Laboratory LUMHS Hyderabad. Duration of study: From January 2015 to June 2015. Materials and Methods: A total of 100 individuals were divided into three groups. Group A consisted of 50 healthy individuals as Controls whereas, Group B and group C included 25 patients each with Benign Prostatic Hyperplasia (BPH) and Prostatic cancer respectively. Individuals taking copper supplements or any other trace elements and heavy metal supplements for the past three months were excluded from the study. Blood samples were collected into heparinized tubes. Serum was separated out and analyzed for biochemical analysis. Statistical analysis was carried out by SPSS version 21.0.

Results: Prostatic acid phosphatase for Group A was 2.28 ± 0.99 , for Group B 16.03 ± 5.89 and for Group C 46.43 ± 6.22 U/L respectively. Highly significant P- value of 0.0001 was noted among all the 3 groups; A, B and C. Serum copper levels in Group A 106.88 ± 19.28 , Group B 104.29 ± 17.40 and Group C 92.88 ± 11.28 $\mu\text{g/L}$ respectively. P value between groups A vs B, A vs C and B vs C were noted as 0.052, 0.001 and 0.022 respectively. Serum copper was reduced in group B compared to A but P value showed no significant difference ($p=0.052$). However, A vs C and B vs C showed statistically significant differences.

Conclusion: The present study reports the raised prostatic acid phosphatase, and decreased serum copper levels in carcinoma of prostate gland indicating their diagnostic and prognostic significance.

Serum Zinc and Acid Phosphatase Levels and Its Correlation in Patients of Benign and Malignant Prostatic Disease

Arsalan Ahmed Uqaili, Sumayya Kazi, Navaid Kazi
Isra University, Hyderabad, Pakistan

Objectives: To estimate and compare the serum Zinc level in patients with benign prostatic hypertrophy and prostate carcinoma and their correlation with serum acid phosphatase.

Methods: Study design: Case control study. Place of study: Postgraduate laboratory, Isra University / Diagnostic and Research Laboratory LUMHS Hyderabad. Duration of study: From January 2015 to June 2015. Materials and Methods: A total of 100 individuals were divided into three groups. Group A consisted of 50 healthy individuals as Controls whereas, Group B and group C included 25 patients each with Benign Prostatic Hyperplasia (BPH) and Prostatic cancer respectively. Blood samples were collected into heparinized tubes. Serum was separated out and analyzed for biochemical analysis.

Results: Mean age in controls (Group A), BPH (Group B) and Ca prostate (Group C) was noted as 61.39 ± 5.88 , 61.44 ± 5.27 and 64.58 ± 3.74 years respectively. Prostate acid phosphatase of Group A (2.28 ± 0.99 U/L), Group B (16.03 ± 5.89 U/L) and Group C (46.43 ± 6.22 U/L) with P- value of 0.0001 highly significant among all the 3 groups; A, B and C. Serum zinc was noted as Group A (85.10 ± 26.53 $\mu\text{g/L}$), Group B (74.64 ± 20.89 $\mu\text{g/L}$) and Group C (63.76 ± 15.42 $\mu\text{g/L}$) respectively. P value between groups A vs. B, A vs. C and B vs. C were noted as 0.065, 0.0001 and 0.031 respectively. Serum zinc was reduced in group B compared to A was low but P value showed no significant difference ($p=0.065$). However, A vs. C and B vs C. showed statistically significant differences.

Conclusion: The present study reports the raised prostatic acid phosphatase, and decreased serum Zinc levels in carcinoma of prostate gland signifying their diagnostic and prognostic value.

Symposium 7: High Altitude and Respiratory Physiology

Heart in High Altitude

Prof. Rajendra Koju

Kathmandu University School of Medical Sciences, Dhulikhel, Nepal

Respiratory System at High Altitude

Annalisa Cogo

Biomedical Sport Studies Center, University of Ferrara

The progressive hypoxia and the subsequent progressive hypoxemia are the well known hallmark of altitude exposure. The human response to hypoxia is characterised by systemic changes in respiratory, cardiovascular and haematopoietic physiology that combine to restore adequate oxygenation. The lung has therefore a crucial role in the adaptation to high altitude. Indeed, during high-intensity exercise at altitude, ventilatory demands increase due to the combined effects of exercise and hypoxia, which strongly affect the ventilatory system above 2000-2500 m. The compensatory responses are related to the level of hypoxemia and become evident when the PaO₂ is \leq 60mmHg. The higher the altitude, the higher the oxygen desaturation, which is more evident during exercise; the time spent with oxygen saturation \leq 90% increases with altitude. An interesting topic is the analysis of thoraco-abdominal coordination and breathing pattern, which can affect the oxygen saturation. In fact, different combinations of tidal volume and respiratory rate can achieve the same ventilation; a ventilatory pattern characterized by a low Respiratory Rate and a high Tidal Volume is associated with a better maintenance of oxygen saturation and is therefore considered more efficient due to the reduction in dead space ventilation.

In the paper we review the hypoxic ventilatory response, the effect of thoraco-abdominal coordination and different breathing pattern on oxygen saturation during exercise at altitude.

Mountain Physiology: Therapeutic Hastening of Acclimation Process on Sudden Ascent to High Altitude

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Introduction: Over 140 million people live at high altitude (7250 m) worldwide. Above 2100 m sea level, the saturation of oxy-hemoglobin begins to plummet. The adaptation on ascent allows partial compensation for the lack of oxygen. Adaptation to hypoxia sometimes go beyond its primary goal of monitoring adequate tissue oxygenation and lead to the development of chronic mountain sickness manifested by erythrocytosis, micro-vascular angiogenesis, hypoxemia and pulmonary hypertension. However, human body can't acclimatize beyond 8000 m altitude and hence referred as the "death zone".

Methods and Results: The armed conflicts at glaciated terrain of Siachen posed the challenge of survival of troops in oxygen deficient environment at sub-zero ambient temperature necessitating the establishment of High Altitude Medical Research Cell (HALMARC), Pakistan which conducted a series of studies to handle the issues of acclimatization, prevention and treatment of acute mountain sickness (AMS), high altitude pulmonary edema (HAPE), high altitude cerebral edema (HACE) and cold injuries.

The volunteers underwent general physical examinations and various cardiovascular, pulmonary, hematological, metabolic, endocrinal and psychological parameters were measured before and after sudden exposure to varying high altitude with and without acetazolamide and/ or dexamethasone. It was found that severity of AMS was correlated with PaO₂ and SPO₃ of hemoglobin. The combination therapy with low dose acetazolamide (Az)-dexamethasone (DMS) was more effective in preventing AMS than using acetazolamide or dexamethasone alone. DMS was also found potentially beneficial in treatment of HAPE or HACE but it takes 24 hours to produce substantial effect and that too in higher doses. In another study, pulmonary vasodilator like Nifedipine was found to be effective in AMS by decreasing PAsP.

Conclusion: Combined prophylactic therapy with low dose of Acetazolamide and Dexamethasone or even Nifedipine complement the process of acclimation on sudden ascent to high altitude.

Futuristic Recommendation: Genetic studies would be of interest to find AMS prone lowlanders and association of genes with physiological adaptations; like HIF-2 α & PHD2 in Tibetans and some association amongst four SNPs in FAM 149 A gene and severity of AMS in Nepalese. More genetic mapping is required to learn underpinning the pathophysiological principles of acclimation.

A Device for Measuring Balloon Compliance for Teaching Lung Compliance

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A simple inexpensive device has been constructed for measuring the compliance of a balloon for teaching lung compliance and its measurement to medical undergraduates. The device comprises a water-filled transparent hard plastic bottle fitted with a balloon, a three-way valve connected to a syringe, and a catheter with 5mm diameter. The catheter is attached vertically on the outer surface of the bottle and serves as a water manometer. The measurement of volume of the balloon, which is initially floppy, is started only after the balloon is inflated and made globular by sucking out water using the syringe. Thereafter, small volumes of water are sucked out using the syringe and the resulting pressure in the water manometer is noted. The pressure-volume data is recorded on a graph paper, with the pressure recorded by the manometer plotted on the x-axis and the volume changes plotted on the Y-axis. The slope of the plot gives the compliance of the balloon.

Poster Session 1

Prolonged Peak Cardiac Autonomic Response Latency in Type 2 Diabetes Mellitus as a Novel Method for Assessment of Cardiac Autonomic Neuropathy

Prathamesh Kamble, Rajesh K Sharma, Ravindra Shukla, Manisha Mavai, Tarun Arora, Suresh
AIIMS Jodhpur, India

Background: The arterial baroreflex mechanism is a physiological control system whose effectiveness depends upon magnitude of response (baroreceptor sensitivity/gain) and time taken to achieve this response (latency). Many studies in diabetic patients as well as in experimental models have demonstrated impairment in baroreflex sensitivity. But little/no attention is given to the latency of peak baroreflex response. Furthermore, delay in peak latency may be of particularly important in patients of diabetes in which the impairment in the cardiac autonomic reactivity is not yet fully established.

Objectives: To study the peak cardiac autonomic response latency in Type 2 Diabetes Mellitus patients with established cardiac autonomic neuropathy (CAN) and diabetics with normal autonomic function.

Methods: A retrospective study was conducted in the 45 diabetic patients (age group 35-50 years) referred to autonomic function lab, Physiology department, AIIMS, Jodhpur during June 2016 to October 2016. Out of 45, 25 patients were diagnosed as cardiac autonomic neuropathy based on resting autonomic tone and autonomic reactivity testing. While remaining 20 diabetic patients had normal autonomic tone and reactivity testing. We also included 15 age and sex matched healthy controls. The latency of peak autonomic response was measured for postural challenge (peak bradycardia latency and peak tachycardia latency) and Valsalva challenge (Valsalva phase II latency and phase IV latency) in milliseconds using BIOPAC System.

Results: The diabetics with CAN had significantly higher ($P < 0.05$) bradycardia latency, tachycardia latency, Valsalva phase II latency and phase IV latency (18.60 ± 3.91 , 16.94 ± 3.9 , 14.2 ± 3.5 & 22.96 ± 6.4) than in diabetics with normal autonomic function (12.14 ± 3.6 , 11.04 ± 4.6 , 10.28 ± 2.5 & 18.69 ± 5.5) and healthy controls (6.24 ± 2.3 , 4.19 ± 2 , 8.87 ± 2.7 & 12.99 ± 1.8).

Conclusion: The delay in peak cardiac autonomic response was observed in diabetics with normal cardiac autonomic function than healthy controls suggesting that latency can novel and early predictor of cardiac autonomic neuropathy. Further studies are needed to delineate this important finding.

Protective Usefulness of Spirulina and Probiotics Against Sodium Arsenite Intoxication in Female Rats

Shamima Khatun, Hasina Perveen, Moulima Maity, Moumita Dash, Sandip Chattopadhyay
Vidyasagar University, Midnapore, West Bengal, India

The major part of the world faces drastic challenges day to day by arsenic mediated health hazards. Managing arsenic toxicosis by diet therapy is yet to be explored, although the conventional therapeutic strategy emphasizes the invasive chelating therapy. Considering this background the present study was carried out to evaluate the prospective defensive role of spirulina and probiotics against arsenic-mediated female gonadal injury. Ingestion of sodium arsenite (As_3^+) contaminated drinking water (10 mg / Kg body weight / day) caused a significant mutilation in the female gonadal steroidogenesis. Uterine tissue experienced a significant impairment of antioxidant status, while a pronounced ovarian follicular degeneration was apparent from the increased number of follicular atresia in arsenic treated rats. All these deleterious effects of sodium arsenite were diminished significantly by intra- gastric delivery of spirulina and probiotics in arsenic fed rat. However, the outcome of this study may indicate that spirulina and probiotics may be incorporated into the meal as nutraceuticals in limiting arsenic-mediated health hazards.

Attenuation of Arsenic Induced Uterine Antioxidant Depletion by Curcumin and a Pectic Polysaccharide (CCPS)

Hasina Perveen, Moulima Maity, Moumita Dash, Shamima Khatun, Syed Sirajul Islam, Sandip Chattopadhyay
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Arsenic poisoning via drinking water is persistently creating a sweltering health problem worldwide. It has now become a comprehensive challenge to manage arsenic-induced health problems by a cost-effective noninvasive way by replacing the conventional painful cum invasive chelating therapy. To pursuit this dictum, this study is intended to emphasize the therapeutic strength of curcumin, and a pectic polysaccharide (CCPS) isolated from Bitter Gourd (*Momordica charantia*) in mitigation of female reproductive ailments in Wistar rats following ingestion of sodium arsenite (As^{3+}) contaminated water (10 mg / Kg body weight / day) for two estrous cycles (8 days). There was a significant diminution in the ovarian key steroidogenic enzyme activities, plasma gonadotropins and estradiol signalling was noted in arsenic ingested rats. Uterine tissues also experienced reduced activity of SOD1, catalase and peroxidase as manifested from hormone assay and native gel electrophoretic study. Circulating levels of vitamin B12 was also measured as this vitamin is one of the major prime factors of s-adenosine methionine (SAM) pool. Curcumin and CCPS co-administration alone or in combination in arsenic fed rats achieved a significant retrieval of arsenic induced female gonadal steroidogenic disorders and oxidative stress with an improvement of circulating level of vitamin B12. The study accentuated that curcumin and Bitter Gourd may develop an efficacious therapeutic approach towards the alleviation of arsenic-mediated illness in the near future.

In Vitro Study on Inhibition of Calcium Oxalate Crystallization by Methanolic Leaf Extract of *Murraya koenigii*

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Ethnomedicinal plants are old as human society for treatment, prevention or mitigation of ailments. *Murraya koenigii* is commonly known as curry plant and recognized as traditionally used medicinal plant for treatment of kidney stones in Tharu Society. The objective of this research was in vitro study on inhibition of calcium oxalate crystallization through titrimetric method. The results showed that inhibitory effect of methanolic leaf extract of *M. koenigii* was comparable activity to standard cystone. Greater inhibitory activity of *M. Koenigii* was found in 8 mg/ml (42.86%) while cystone showed maximum activity at 16 mg/ml (41.07%). This study showed the higher activity of *M. koenigii* than standard. Inhibitory activity of *M. koenigii* was concentration dependent manner indicating the decrease of stone forming constituents. This activity of *M. koenigii* might be due to presence of saponins, flavonoids, steroids etc. Thus, further in vivo study on leaf extract of *M. koenigii* and its chemical characterization could be new candidate for treatment of kidney stone diseases in future.

Changes of Perceived Stress among Undergraduate Pharmacy Students in International Islamic University Malaysia: Two Years Longitudinal Study

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This study compares the students' perceived stress scale (PSS score) and their physiological status after two (2) years period of studying Pharmacy programme. The data of the study done in 2014 was compared with the previous study which was conducted in 2012. This study focused on changes of same students' PSS score when they were in first year and third year since there were changes in academic burdens and study environment to them. Moreover, study was aimed to compare the changes of PSS score between two different genders, identifying the correlation between the PSS score and their physiological status such as body mass index (BMI), waist circumference, fat percentage and their blood pressure. PSS score was measured by using a set of questionnaire to determine the severity of their stress and find out their solutions to overcome the condition.

As a result, mean PSS value in male and female in third year was higher than that of in first year. Males' PSS score (30.13 ± 6.62) in year 3 was significantly higher than their score (24.26 ± 6.53) taken in year 1. PSS score (30.8 ± 4.89) of the whole class in year 3 was also significantly higher than year 1 scoring (26.14 ± 5.94). Moreover, students' BMI and fat percentage were found higher in year 3 compare to year 1 but the changes was insignificant. There is significantly higher in students' systolic blood pressure in 2014 compared to 2012. This study highlighted that academic stress among Pharmacy students is increasing within 2 years period.

Perception of Health Care Workers Regarding Postpartum Physical Activities of Mothers with a History of GDM: A Community Based Qualitative Study

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Background: GDM is a leading cause for T2DM. Physical activity modification is a major intervention to attenuate progression to diabetes. Nurses and midwives, the closest healthcare workers of mothers are the motivators and counselors during pregnancy and postpartum period.

Objectives: To explore the perceptions of healthcare workers regarding factors that affect the postpartum physical activity modifications of mothers with a history of GDM.

Methods: A descriptive qualitative methodology was used for data collection. Field midwives and postnatal nurses three each from three districts were invited for this study. In depth interviews were conducted using semi structured interview guides until saturation point was achieved. Thematic analysis was conducted to analyze the data. Ethical approval was obtained from the Ethics Review Committee, University of Sri Jayewadenepura.

Results: The following themes were identified in the thematic analysis; health believes (n=6), traditional and cultural believes (n=6), social influence (n=5) lack of awareness of mother and family members (n=5), lack of influence from health care workers (n=5) and lack of motivation (n=5). In addition to these major themes, lack of time and child demands emerged as minor themes. Non-optimal awareness of health care workers was found out as a major drawback for exercise interventions of postpartum mothers

Conclusion: Health believes, traditional and cultural limitations, knowledge gaps and family believes should be addressed to achieve optimal benefits of physical activity modifications during postpartum period among mothers with a history of GDM. Awareness of healthcare workers should be increased to achieve expected results.

Association Between Executive Functions, Physical Activity and Quality of Life Among Physically Independent Elderly People Living in Elderly Care Institutions in Galle, Sri Lanka

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Background: The proportion of institutionalized elderly people has increased in Sri Lanka during the recent decades as a result of population aging and ongoing sociocultural changes. Cognitive functions will be increasingly important for them for independent living. The executive functions (EFs) such as working memory (WM) and inhibitory control (IC) are cognitive processes that are vital for goal directed behavior.

Objectives: Study was conducted to assess the association between EFs, level of physical activity (PA) and quality of life (QOL) among elderly people living in institutions.

Methods: Study was conducted with 190 elderly people living in institutions. WM was assessed via computerized verbal working memory (VWM) and IC via number of errors in stroop task. Level of PA was assessed using IPAQ while QOL via WHOQOL-BREF. Correlation was assessed through spearman correlation coefficient (r).

Results: The sample comprised of 69.5% (n=132) females with mean age of 71.78 years (+6.5). Mean score of IPAQ was 1117.65 MET-minutes/week (+454.18). Mean total scores of QoL and subscale scores for general, physical, psychological, social and environment domains were 58.66(+11.09), 55.32(+15.06), 62.68(+13.90), 59.38(+14.80), 53.62(+22.11) and 62.30(+11.70) respectively. Mean scores of VWM and stroop tasks were 11.15(+6.14) and 8.88(+3.99) respectively. Both VWM and stroop inhibitory tasks were significantly correlated with PA level ($p < 0.01$). VWM was significantly correlated with total score and environmental, psychological health domains ($p < 0.05$). IC was significantly correlated with environmental, psychological and general health domains ($p < 0.05$).

Conclusion: Both WM and IC was significantly correlated with their level of physical activities and with most of the domains of QOL of the elderly living in institutions.

Evaluation of Autonomic Dysfunction by Heart Rate Variability Analysis in Type 2 Diabetes Mellitus

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Background: Cardiac autonomic neuropathy (CAN) is a severe and common, yet highly underdiagnosed, complication of type 2 diabetes mellitus (T2DM). Subclinical CAN may have reduced heart rate variability (HRV) but normal Ewing battery test.

Objectives: To evaluate the importance of 5-min HRV for the detection of autonomic dysfunction in T2DM without cardiac autonomic neuropathy (CAN T2DM).

Methods: This cross-sectional observational study was conducted at the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU) on 30 recently diagnosed and 54 long-term CAN T2DM male patients, aged 45 to 55 years, from the Endocrinology OPD of BSMMU, Dhaka. Thirty age and BMI matched apparently healthy male subjects were control. Ewing battery test was used to rule out cardiac autonomic neuropathy positive (CAN+) T2DM. HRV data were recorded by a polyrite-D and analyzed by the software. HRV was assessed by time domain method. For statistical analysis, ANOVA and unpaired t-test were used.

Results: Mean RR, SDNN ($p < 0.05$), variance and RMSSD were significantly ($p < 0.001$) lower and mean HR and SDNN/RMSSD were significantly ($p < 0.001$) higher in long-term T2DM compared to recently diagnosed T2DM and control. In addition, SDNN was also significantly ($p < 0.05$) lower in recently diagnosed T2DM that of control.

Conclusion: Results conclude that autonomic dysfunction may occur in both long-term and recently diagnosed T2DM patients without neuropathy and 5-min HRV test is an important tool for detecting subclinical CAN.

Assessment of Physical Fitness Status Among Medical Students of Both Sexes

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Background: Physical Fitness Index (PFI) is one of the important criteria to assess the cardiopulmonary efficiency of human beings. Physical fitness is not only the capacity to perform a sedentary task but also the capacity to deal with emergency demanding on unaccustomed physical efforts.

Objectives: The aim of the present study is to evaluate PFI among medical students of both sexes.

Methods: The PFI was evaluated by Modified Harvard step test of randomly selected 90 medical students (55.55% males & 44.45% females).

Results: Mean height and body mass index (BMI) of male and female subjects respectively: $1.68 \pm 0.07\text{m}$, 21.85 ± 3.21 & $1.56 \pm 0.05\text{m}$, 22.08 ± 3.69 . Considering the obesity in term of BMI, the female subjects were more obese than male. The mean pre-exercise heart rate in female (85.35 ± 9.38) is greater than male (78.94 ± 10.68), which is statistically significant ($p < 0.05$). While expressing pre-exercise vagal tone in term of heart rate, the vagal tone was more in male students compared to female. Statistically significant ($p < 0.03$) higher mean PFI was observed in male with respect to female, however, cardiovascular efficiency in term of recovery heart rate, the mean heart rate of female in 5 minute of recovery time is 1.67% more than the male.

Conclusion: This study shows that PFI of male medical students is greater than female counterpart but surprising the recovery heart rate in female is faster than male which required further study.

Effect of Cold Stimulation Induced Pain on Galvanic Skin Response in Medical Undergraduates of Kathmandu University School of Medical Sciences (KUSMS)

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Background: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage which is affected by the psychological factors. Pain is known to influence the sympathetic nervous system that is monitored by measuring galvanic response of the skin. Galvanic skin response (GSR) is defined as the changes in the electrical activity of the skin and used to monitor emotional and sympathetic response by means of the activity of sweat glands. Cold pressor test increases the sympathetic activity of sweat gland which increases the skin conductance and decreases the electrical resistance of skin.

Objectives: Thus the present study was undertaken to evaluate the changes in skin conductance during the pain induced by cold stimulation.

Methods: Our study was a cross sectional study with the sample size of 40 including 20 males and 20 females from medical undergraduate students. Acute pain was induced by cold pressor test (immersion of hand in cold water at 4°C). Changes in GSR were recorded by the AD instrument. Statistical analysis was done by using Paired "t" test.

Results: Results showed that skin conductance was significantly increased ($P < 0.005$) from 4.24 ± 2.53 microSiemens to 5.36 ± 2.7 microSiemens in male and from 3.44 ± 1.52 microSiemens to 4.26 ± 1.6 microSiemens in female during cold pressor test.

Conclusion: Our GSR findings point towards autonomic adjustments suggesting more of sympathetic over activity during cold induced acute pain.

Assessment of Pulmonary Function Test Among Brick Kiln Workers in Bhaktapur District, Nepal

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Background: Brick-kiln environment is infiltrated with gases, fumes and particulate matter. Thus, brick-kiln workers are at high risk of developing respiratory problems. Very few studies have been conducted to evaluate the effect of gases, fumes and particulate matter on pulmonary function parameters among brick-kiln workers in Bhaktapur district till date.

Objectives: This study was undertaken to assess the extent of altered pulmonary functions in brick-kiln workers in Bhaktapur district and the attenuation of spirometric values if any, with the duration of occupational exposure.

Methods: The study was carried out among 51 nonsmoker male brick-kiln workers (age group 20-50 years); and 51 nonsmoker age and sex matched individuals, not exposed to brick-kiln environment. PFTs were carried out by using spirometer (Spiro Excel Medicaid). Furthermore, brick-kiln workers were divided into three groups on the basis of duration of exposure (DOE); group I (DOE<5 years), group II (DOE; 6-10 years) and group III (DOE; 11-18 years). The values of PFTs were compared statistically.

Results: Results revealed significantly lower FVC (2.69 ± 0.59 L vs 3.47 ± 0.54 L), FEV₁ (2.25 ± 0.58 L vs 3.02 ± 0.46 L), PEF (5.82±1.84L/s vs 8.28±1.66L/s), FEF_{25-75%} (3.62 ± 1.18 L/s vs 4.7 ± 1.06 L/s) and MVV (70.37 ± 20.49 L/min vs 91.87 ± 23.63 L/min) among brick-kiln workers than their normal age-matched counterparts ($p < 0.05$). Nevertheless, the value of FEV₁/FVC ratio ($85.32 \pm 8.55\%$ vs $87.04 \pm 3.99\%$) did not show significant decrease. PEF (6.35±1.75L/s vs 4.56±1.57L/s), FEF_{25-75%} (3.98 ± 1.06 L/s vs 2.76 ± 1.09 L/s) and MVV (76.05 ± 20.84 L/min vs 61.21 ± 15.53 L/min) were noted to be significantly lower in group III than in group I.

Conclusion: Thus, brick-kiln workers are at high risk of developing attenuated pulmonary function and the degree of impairment was directly related to duration of exposure.

Gestational Diabetes Mellitus: An Emerging Threat in Pakistan?

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Background: Gestational Diabetes Mellitus (GDM) affects a great number of women worldwide.

Objectives: In this study we sought to evaluate the occurrence of GDM and its association with demographic and anthropometric variables in pregnant females visiting tertiary care hospitals of Karachi.

Methods: A total of 1210 pregnant females from Karachi were screened for GDM. After taking an informed written consent, all participants were screened by 75-g 2-hours Oral Glucose Tolerance Test (OGTT); 24–28 weeks of gestation and classified as per “The International Association of Diabetes and Pregnancy Study Groups (IADPSG)” criteria. Weight, BMI and serum HbA1c levels were measured. Women with pre-gestational diabetes were excluded. Data was statistically recorded using SPSS version 21. Mann Whitney U test, Pearson’s correlation and Chi square/Fischer exact tests were employed; where p value <0.05 was considered significant.

Results: All 1210 pregnant females underwent OGTT and the frequency of GDM was found to be 17.1% ($n=208$). Gestational diabetes was associated with advancing age, deranged HbA1c, elevated BMI at booking ($p<0.001$) and history of first-degree type 2 diabetic relatives ($p =0.05$). When stratified according to ethnicities; of the 208 GDM women, no difference was observed in terms of GDM predilection.

Conclusion: In our study, preexisting adiposity and presence of strong family history rendered 17% pregnant females to suffer from GDM. Screening and early detection of GDM in all pregnant women and frequent monitoring is recommended for prevention of a number of maternal and neonatal complications.

Calculus Induced Hydronephrosis Obstructive Syndrome in a Patient with Two Separate Pelvic Calyceal System in Right Side with Bifid Ureter: A Rare Clinical entity

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Background: The Bifid Ureter is a rare case of congenital kidney anomalies or defect resulting from the untimely and early division of ureteric diverticulum occurring in 0.08% of general population. However the case of bifid ureter with calculus at the junction of bifid ureter is extremely rare. The case is often asymptomatic, unless triggered by some form of calculus or physiological condition.

Objectives: 1) To illustrate the case of bifid ureter. 2) To reveal the case of calculus induced hydronephrosis obstructive syndrome as the rare clinical entity.

Methods: The present case is diagnosed by the routine radiological procedures i.e. Computed Tomography Intravenous Pyleogram (CT IVP) by the intravenous infusion of contrast medium followed by X-ray after specific interval of time.

Results and Conclusion: The radiological finding by Computed tomography Intravenous Pyleogram (CT IVP) reveals well contrasted imaging that there is presence of two different pelvicalyceal systems in the right side with bifid ureter that unite before emptying into the bladder at upper ureteric level. There is a presence of single large calculus measuring approx. 8.6×8 mm at the junction bifid ureter at the level of L3 vertebra inducing hydronephrosis and upstream dilatation of right upper ureter. Bifid ureter may remain asymptomatic throughout the life, knowledge of the different anatomical variations of the ureter and kidney can help to recognize different physiological state, diseases.

Effects of Non-Weight Bearing Leg and Foot Exercises on Ulcer Healing and Its Associated Factors in Patients with Type 2 Diabetes

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Background: Impaired ulcer healing increases morbidity, mortality and cost of care in patients with diabetic ulcers. Though ankle exercises has shown a positive healing response, its role on diabetic ulcer healing is not yet reported.

Objectives: To evaluate the effects of non-weight bearing leg and foot exercises on ulcer healing and sensory neuropathy status in patients with diabetic ulcers.

Methods: In this prospective study (n=87), subjects in the intervention group (n=41) performed home based non-weight bearing leg and foot exercises till ulcer was healed or for a maximum period of 12 week. Control group (n=46) received usual care. Ulcers were photographed and measurements were taken on digital images by planimetry software at baseline and 4 weekly up to 12 weeks. The effect of exercises on pressure, vibration and position senses was also assessed. Ethical clearance was obtained from Ethics Review Committee, University of Sri Jayewardenepura.

Results: A significant percent reduction of ulcer surface area was seen in the intervention compared to control group at 4 weeks ($p=0.025$). However, there was no difference seen when the total duration was considered. Also, a significant reduction of insensate sites in the foot was seen in the intervention compared to control group (18/23 vs 10/27; $p=0.001$) during the study period.

Conclusion: Non-weight bearing leg and foot exercises facilitate ulcer healing in the acute stage of the ulcer and improve pressure sense of the foot. These findings will form the basis of further studies in designing non-invasive, low-cost adjuvant therapy to facilitate diabetic ulcer healing.

Predilection of Teaching Aids Among First Year Medical Students During Teaching and Learning Activities in Physiology at SSR Medical College, Mauritius: A Cross-section study

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Background: Teaching aids are the e tool which play important role in teaching and learning process in such way that it made the classroom live and active, interactive and also create environment of interest for the students. As well as it helps to clarify and understand the subject matter in a better way. The objective of this study is to know the opinion of students regarding the teaching aids among 1st year student during teaching and learning activities in physiology at SSR Medical College.

Material and Methods: The data were collected by pre-design questionnaire among the 1st year students of SSR Medical College, Belle Rive, Mauritius. The study was conducted in between March- April 2016. Out of 147 students, 139 students were participated in the study. The results were analyzed using SPSS Version 20, nonparametric test and P value were analysed by using Chi-Square test. $P < 0.05$ were consider as significant.

Results: In this study, students of 1st year MBBS preferred the combination of black board and power point for teaching and learning activities in the department of physiology. 60.4% of student thought that combination of black board and power point was most beneficial compared to blackboard, PowerPoint and whiteboard which were selected by 24.5%, 14.4% and 0.7% respectively. In the response to which method was most understandable, knowledge, retention, stress on important points, combination of black board and power point was chosen by 51.8%, 64%, 48.2%, and 47.5% receptively. The medical students believe that most captivating, interactive, excellent visual clarity, cover more topic per lecture, can be easily summarized, impact on presentation were provided by using for combination of black board & power point 55.4%, 57.6%, 56.8%, 46%, 51.1%, and 56.8%. All these result were statistically significant.

Conclusion: This study shows that majority of the students preferred combination of aids viz. black board and power point for learning physiology.

Knowledge and Practices Regarding Use of Different Types of Inhaler Devices Among Patients Attending Asthma Clinic at the Colombo South Teaching Hospital – Kalubowila, in Sri Lanka

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Objectives: To assess the knowledge and practice regarding use of different types of inhaler devices among patients who attend the asthma clinic at the Colombo South Teaching Hospital-Kalubowila

Methods: This is a descriptive cross sectional study involving 100 patients who attended asthma clinic at the Colombo South Teaching Hospital. Interviewer administered questionnaire and inhaler specific check list were used to gather information from patients. Patients were shown different types of inhaler devices and ask them to identify the device which they are using.

Results: There are 38% males and 62% females in the study population with just only 2 who had degree/diploma. Majority of study participants (65%) had studied up to grade 11. Most of the study participants (62%) had income less than Rs. 10000 per month. Majority of the patients (91%) knew that asthma is a disease caused by the hyper responsiveness of airways to various allergens and 70% of the patients knew that it is not an infective disease but only 32% of patients knew that asthma is a chronic disease. Only 3% of patients knew the names of the drugs they used, while only 12% of participants knew the action of their drugs and 74.0% of the patients committed at least one error in inhaler technique.

Conclusion: Although the majority of the patients claimed to know how to use inhalation devices, the fact that 74.0% committed at least one error shows that their technique was inappropriate. Educational level of patients, number of times patients were observed during inhalation, types of instructions given before using the inhalation, family history and age are the factors contribute to the incorrect inhalation technique. The results showed that the level of education among study population was a significant factor that determines the use of correct inhalation techniques. ($p=0.039$). Age is another factor that was shown to be contributed significantly ($p=0.012$) to improve the inhalation technique. Patients with relatives with bronchial asthma performed less errors than the others and that value is statistically significant. ($p=0.009$). So inhalation technique should be regularly checked and correct when necessary.

Anulom Vilom Pranayama: Can It be Medication for Hypertension?

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Background: Yoga as a therapy for various ailments is being popular day by day. Pranayama- a part of yoga techniques is being a focus in physiological research. Here authors with his research team plans to study the Anulom Vilom Pranayama (also called Alternate nostril breathing) in depth.

Objectives: The objective of the study is to find the implication of ANB in medical science.

Methods: Two key words, 'alternate nostril breathing' and 'anulom vilom' were searched in pubmed search engine. All the articles were studied extensible to find the effect on blood pressure and its probable cause.

Results: Most of the researches showed that ANB decreases BP, HR and RR. More interesting finding is - the right nostril breathing leads to increased sympathetic activity while left nostril breathing decreases sympathetic activity and increases parasympathetic tone.

Conclusion: A hypothesis can be generated that if a person nasal cycle is dominant towards right than s/he may have hypertension in long run. If so, he can be treated naturally with ANB-15 minutes/ twice a day in a 4 hour fasting stomach or with Left nostril breathing -same prescription. This has to be tested with more extensive research which is under process.

Home, School Environmental Factors and Peer Pressure Contributing to Stress Among Adolescents in Colombo district Sri Lanka - Preliminary Results

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Psychosocial adversities at home, school, peer pressure and other factors contribute to stress amongst adolescents. Adolescent stress levels can be assessed by the Adolescent Stress Questionnaire (ASQ) [Byrne et al. (2007)]. The main objective of the study is to determine factors that contribute to stress amongst adolescents in Colombo District. A descriptive cross sectional study was conducted on adolescents aged 14 to 16 (n=70) attending government schools. Baseline data were obtained and the ASQ was administered. Stress at home, school and peer pressure were assessed by analyzing the ASQ scores.

The mean age for study sample was 15.21 years \pm 0.50 SD. 51% were females. Subjects were divided into stressed and non-stressed groups based on the ASQ score. 34.28 % were stressed in relation to home environment. The mean home environment score was significantly higher in the stressed group (28.79 \pm 4.66 SD Vs) than in the non-stressed group (13.79 \pm 3.76 SD) ($p < 0.0001$). The mean score for stress of school performance was significantly higher in the stressed group (20.21 \pm 4.827 SD Vs 13.70 \pm 3.765 SD; $p < 0.0001$). The mean score for stress of teacher interaction and stress of peer pressure was significantly higher in the stressed group than in the non-stressed group ($p < 0.0001$).

Measures to avoid or minimize stress factors may significantly reduce stress. Awareness should be created amongst parents, care givers, teachers and peers to reduce stress amongst adolescents who are passing through a vulnerable period of their lives.

Effects of Body Mass Index on Sensory Nerve Conduction: A Cross-Sectional Study

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Background: Body mass index (BMI) is one of the very commonly used indicators of obesity. Obesity has been identified as a global epidemic with increased risk for co-morbidities like diabetes, hypertension, hyperlipidemia and hence affects neuronal functions either directly or indirectly.

Objectives: The present study aimed to assess the profile of sensory nerve conduction and evoked potentials in obese individuals.

Methods: Total of 52 age-matched subjects were included in the study after meeting the inclusion and exclusion criteria and were divided into two groups based on their BMI; control (n=25) and study group; obese (n=27). Sensory nerve conduction parameters (standardized distal sensory latency in ms, amplitude of sensory nerve action potential in μ V, sensory nerve conduction velocity in m/s) and somatosensory evoked potential (SSEP; N20 and P37 latency and amplitude) were recorded in both upper and lower limb and the difference in these parameters between the groups was assessed using independent t-test.

Results: All the parameters depicted significant decrease of sensory conduction in peripheral nerves (median, ulnar, and sural) in obese individuals compared with the control group while the central sensory conduction (SSEP) remains unaffected.

Conclusion: From the present study, we observe that in obesity, there is decrease in sensory nerve conduction in peripheral nerves without affecting the central conduction, which indicates slow transmission in peripheral nerve fibers only.

Antioxidant Role of Beta Carotene: Protection Against Cadmium Induced Testicular Toxicity

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Cadmium (Cd) is an industrial pollutant that affects the male reproductive system. The purpose of present study was to investigate the protective role of Beta carotene on cadmium induced testicular damage. The present study was conducted following approval from Institutional Bioethical Committee and strict internationally accepted guidelines, for the usage of animals in experimental study were. Rats were divided into four groups with 8 rats in each. The Gr. I rats were administered with the single dose of normal saline intraperitoneally. Group II received Beta carotene (10mg/kg bw) orally for 30days. Group III received a single dose of 1mg/kg bw cadmium chloride and Group IV Bet carotene for 30 days prior to cadmium administration. After the desired protocol, rats were sacrificed & both the testes were removed for biochemical & histopathological evaluation. One testis was fixed in Bouvins fluid and processed or histopathological studies. The levels of lipid peroxides (LPO) and glutathione (GSH) & superoxide dismutase (SOD) were detected in the tissue homogenates of other testis. In the present study, the level of lipid peroxidation (LPO) was significantly high & GSH & SOD ($P < 0.001$) were low in cadmium treated rats compared to normal control. Pre-treatment with beta carotene showed a protective effect by decreasing LPO & increasing GSH & SOD level ($P < 0.001$). The morphological changes like atrophy of tubules, edema & decreased spermatogenesis in the testis of rats exposed to cadmium chloride. But, antioxidant showed the normal architecture of the testis. Results of the present study showed the antioxidative role of beta carotene in protecting the testis from cadmium induced toxicity

Effect of Vitex Agnus Extract on Induced Mammary Tumor of SD Rats – A Histopathological Study

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Background: Breast cancer is one of the most serious and life taking etiologies of the present time. The cause and treatment of breast cancer still remains the major concern of medical and health sciences. Vitex agnus also known as Vitex agnus castus (VAC) or Vitex nirgundi is used for many reproductive problems of females and widely used for the treatment of pre-menstrual stress syndrome and cyclical breast pain. Vitex agnus extract is used in the present study to see its anticancer effect in mammary tumors.

Objective: The objective of the study was to investigate the in-vivo anticancer effect of hydroalcoholic extract of Vitex agnus in ameliorating the mammary tumor of the SD rats.

Methods: 30 day old inbred Sprague dawley (SD) female rats of body weight 70-80 grams were taken for this study. The rats were induced with MNU for mammary tumor development. After the development of palpable and visible tumor the rats were given hydroalcoholic extract of Vitex agnus.

Results: Histopathological findings showed the presence of benign tumor in rats treated with Vitex agnus extract indicating the positive treatment of mammary tumor.

Conclusion: Therefore, this study suggests that Vitex agnus extract can be useful for the treatment of mammary tumor.

Effect of Micro Infusion of Orexin B on Consummatory Behavior and Expression of Catecholamines in the Nucleus Accumbens of Male Wistar Albino Rats

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Background: Nucleus accumbens is a basal forebrain structure situated deep in the grey matter which is also involved in feeding behavior. Orexins are multifunctional peptides have been implicated in feeding/drinking, sleep-wakefulness, arousal and energy homeostasis. However most of these studies were on orexin A and involved hypothalamus and Ventricles of CNS.

Objective: To elucidate the role of catecholamines in orexin B induced feeding behaviour in Wistar rats.

Methods: Inbred male Wistar rats (n= 24) were divided into four groups. i. e Control, Treated 1(orexin B-3nm/ μ l),Treated 2(30nm/ μ l) and Treated 3(orexin B antagonist) groups. Using stereotaxic method, guide cannula was set in place bilaterally to reach NAc. Orexin B and its antagonist, TCS-OX2-29 were infused in separate groups of overnight fasted rats. Food and water intake were carried out at 1hr, 2hrs, 4hrs, 12 hours and 24hrs in all the groups. Further, the levels of dopamine, adrenaline and noradrenaline were estimated in brain tissue homogenate.

Results: Orexin B (30nm/ μ l) increased dopamine and noradrenaline levels significantly when compared to controls. In antagonist infused group dopamine and noradrenaline levels were decreased significantly.

Conclusion: These results suggest that orexin B plays a role in the modulation of feeding behaviour. Present study provides further evidence for orexin B mediated consummatory behaviour is affected by catecholaminergic neurotransmission in NAc.

Association of High Body Mass Index with Gestational Diabetes Mellitus and Pregnancy Induced Hypertension in Pregnant Women

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Background: Women with high Body Mass Index (BMI) before or during pregnancy are reported to be at a greater risk for complications in pregnancy with the risk levels increasing with increase in BMI.

Objective: This study aimed to assess the incidence of gestational diabetes and pregnancy induced hypertension in obese pregnant women

Methods: This study was a retrospective observational study conducted over 1 year period on 300 pregnant women in their second trimester attending antenatal clinic. Study was done after obtaining Ethical clearance from the institution and written informed consent form the pregnant subjects. BMI was calculated after measuring the height and weight. BMI from 25-29.5 was considered over weight; 30 and above was taken as obese. Screening for gestational diabetes mellitus (GDM) was conducted at 24-28 weeks using 50gram glucose tolerance test. Levels >140mg/dl was considered as GDM. A persistently elevated blood pressure systolic >140mmHg, diastolic >90mmHg on more than 2 occasion was considered as Pregnancy induced hypertension (PIH). Data was analyzed using SPSS version 13 by chi-square test. $P < 0.05$ was considered statistically significant.

Results: Out of 300 subjects 62 developed GDM. Among them 55 were in overweight and obese category, which was highly significant ($P < 0.0001$). Out of 300 subjects 61 developed PIH. Among them 56 were in overweight and obese category, which was highly significant ($P < 0.0001$).

Conclusion: This study supports strong association between high BMI and risk of GDM and PIH.

Vitamin D Receptor (Cdx2) Polymorphism and Risk of Polycystic Ovarian Syndrome (PCOS) in Females of Sindh, Pakistan

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Background: Vitamin D, a secosteroid regulates various biological processes by binding to its receptor called vitamin D receptor (VDR) located within the nucleus of every possible cell including reproductive cells. However, its role in the pathogenesis of PCOS is controversial. VDR is existed in 200 variants among which Cdx2 is less studied. VDR-Cdx2 is located at the promoter area of VDR gene and might play role in the development of insulin resistance in PCOS.

Objective: The aim of this study is to examine the association of VDR-Cdx2 polymorphism and PCOS females.

Methods: A total of 150 PCOS and 100 healthy females were recruited from tertiary hospitals located in Karachi and Hyderabad. Genomic DNA was extracted by peripheral blood through "salting out" method and genotyping was carried out using tetra-primer amplification refractory mutation system PCR (T-ARMS-PCR) technique. Hardy-Weinberg equilibrium (HWE) was determined for genotype distribution among controls. Pearson chi-square along with odds ratio and 95% confidence interval was recorded to demonstrate the association and risk respectively between PCOS and controls.

Results: Our study showed all controls were in HWE. A non-significant association was obtained among PCOS and VDR-Cdx2 polymorphism but the risk was obtained in GG genotype (OR = 1.3653, 95 % CI = 0.6560 - 2.8417).

Conclusion: GG-Cdx2 genotype increases the risk of PCOS. Further investigations are needed to assess the relationship of other SNPs and linkage disequilibrium with PCOS.

Clinical Characteristics of Ischemic Stroke in Patients with and without Diabetes

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Background: Diabetes mellitus is a well-established independent risk factor for stroke but the difference between diabetic and non-diabetic patients with cerebral infarction is still unclear.

Objective: to observe socio-demographic characteristics and clinical presentation in patients with diabetes compared with patients without diabetes.

Methods: Diabetes was diagnosed in 76 (20%) of 380 consecutive patients with cerebral infarction admitted into Rangpur Medical College Hospital, Bangladesh over a 18-months period. Demographic characteristics, cardiovascular risk factors and clinical events in ischemic stroke patients with and without diabetes were compared.

Results: Patients with diabetes (n=76) compared to patients without diabetes (n=304) were younger (p=.034) and they were more likely to have hypertension (p= .037), hyperlipidemia (p=.016), ischemic heart disease (p=.029), previous cerebral infarction (p=.043) and renal impairment (p=.023). Diabetic group frequently presented with sub-acute stroke onset (p=.026), limb weakness (p=.041), dysarthria (p=.040), dysphagia (p=.039). On the other hand, they were less likely to be above 80 years (p=.044) and to have valvular heart disease (p=.035), sudden stroke onset (p=.026), aphasia (p=.046) and seizures (p=.044).

Conclusion: Stroke in diabetic patients was different from stroke in nondiabetic patients from several perspectives including a poor prognosis in terms of motor function, which emphasizes the need for early diagnosis and treatment of every case of diabetes.

Comparative Study on Effect of Yogic Asanas and Pranayama [Breathing Exercises] in Reducing Postmenopausal Symptoms in Women Undergone Surgically Induced Menopause with Hormone Replacement Therapy

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Background: Menopause is the term used for cessation of menstrual bleeding for a period of one year.

Objective: This study was done to assess the symptoms reduction by applying yogic asanas and pranayama in women who has under gone hysterectomy in early age group and on hormone replacement therapy.

Methods: 60 women of age group 30- 40 years overall were taken in the study by the questionnaire based on post menopausal symptoms, 30 women were included in the test group and 30 women as control, who undergone hysterectomy before occurrence of natural menopause ,test group were performed yoga and pranayama for 1 hour daily in the morning under supervision of yoga instructor. The groups were analysed by standard mean deviation p value<0.05 as significant.

Results: Comparative analysis of the study shows significant (p value <0.05) reduction of post menopausal symptoms in test group than control group. This study shows drastic changes in symptoms of anxiety, stress, hot flushes and insomnia.

Conclusion: The natural therapy [YOGA] along with hormone replacement therapy brings out the good results in reducing and managing postmenopausal symptoms in early aged group women undergone hysterectomy.

Effects of Tobacco Consumption on Hematological Status in Tobacco Users

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Background: In the recent decades a massive global increase in tobacco use has been seen. Immediate availability and the low price give rise to high consumption of tobacco and causes alteration of hematological parameters. Hemoglobin concentration, PCV, MCV, MCH, MCHC, total count of RBC, total count of WBC, differential count of WBC and total count of platelets are altered in tobacco users. Alterations of these parameters are associated with a greater risk for developing chronic pulmonary diseases and cardiovascular diseases.

Objective: To observe the effects of tobacco consumption on hemoglobin concentration, PCV, MCV, MCH, MCHC, total count of RBC, total count of WBC, differential count of WBC and total count of platelets in tobacco users.

Methods: This cross sectional study was conducted from July 2014 to June 2015 in the Department of Physiology, Rangpur Medical College, Rangpur. A total number of 150 subjects were selected, among them 50 were apparently healthy non-tobacco chewer non-smoker subjects (group A), 50 were apparently healthy tobacco chewer smoker subjects (group B) and 50 were apparently healthy tobacco chewer non-smoker subjects (group C). The subjects were selected from Rangpur district. For statistical analysis one – way ANOVA (post Hoc test) was performed by computer based software SPSS- 17.0 version for windows.

Results: Hemoglobin concentration, PCV, MCH, total count of RBC, total count of WBC, eosinophil%, basophil%, lymphocyte% were significantly higher and neutrophil% was significantly lower ($p < 0.001$), MCHC was higher but non-significant, no significant change in MCV, monocyte%, total count of platelets in tobacco chewer smoker & tobacco chewer non-smoker subjects as compared with the healthy control subjects

Conclusion: There is effect of tobacco consumption on hematological parameters. All these alteration suggests that consumption of tobacco lead to atherosclerosis, polycythemia vera, chronic obstructive pulmonary disease and cardiovascular diseases.

Preliminary Results on Lung Function Parameters of Sri Lankan Tamil Adults in Northern Province

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Background: South Indian norms are commonly used to interpret the lung function parameters of Sri Lankans due to lack of ethnic specific Sri Lankan norms.

Objective: To establish reference values for lung function parameters of Sri Lankan Tamil adults.

Methods: This was a population based descriptive study. Participants (256 males and 239 females) were recruited from Jaffna and Vavuniya districts by cluster sampling. Age, standing height, Sitting Height (SH), weight, arm span, Peak Expiratory flow Rate (PEFR) and spirometric parameters were measured.

Results: The mean and standard deviation of Vital capacity (VC), Forced Vital Capacity (FVC), Forced Expiratory Volume in the first second (FEV1), FEV1 % and PEFR in males were 3.4±0.6 L, 3.5 ±0.6 L, 3.0 ±0.5 L/s , 85.1 ±4.8 % and 469 ±71 L/min respectively. In females, the Mean ± SD of VC, FVC, FEV1, FEV1 % and PEFR were 2.4±0.4L, 2.5±0.4 L, 2.1±0.4 L 87.8±4.6 % and 322±50L/min respectively. Prediction equations derived by multiple regression analysis using the SH, arm span and age are given below:

VC

VC (Males)= 0.035 SH (cm) + 0.3 arm span (cm) - 0.016 age (years) - 4.11

VC (Females) = 0.021 SH (cm) + 0.023 arm span (cm) - 0.014 age (years) - 2.41

FVC

FVC (Males)= 0.041 SH (cm) + 0.028 arm span (cm) - 0.019 age (years) -4.08

FVC (Females)= 0.019 SH (cm) + 0.023 arm span (cm) - 0.017 age (years) - 2.05

Conclusion: This study provides useful information on lung function parameters of Sri Lankan Tamils which has not been established before.

Cardiac Autonomic Tone in Response to Sub-Maximal Exercise in Young Adults

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Background & Objectives: Evaluation of heart rate variability (HRV) at rest, during exercise and recovery is an approach to study the underlying physiological mechanisms of cardiac rhythm regulation. The cardiac autonomic indices of short term HRV are increasingly used as a reliable tool of cardiorespiratory fitness. We investigated the modification in cardiac autonomic activities induced by 3-minutes step test exercise (Canadian Home Fitness – CHF protocol) in healthy young adults using HRV analysis.

Methods: We studied effect of exercise on HRV in consenting healthy postgraduate students from BP Koirala Institute of Health Sciences, Dharan, Nepal (n=9, mean age 24.8 yrs). Anthropometric and cardiorespiratory variables were measured before the step test. The R-R intervals for HRV were recorded using portable POLAR HEART RATE MONITOR (S810i) USA/GBR at baseline, during exercise and during recovery for five, three, and five min, respectively. Artifacts were removed /corrected. Then the R-R intervals were analyzed by fast Fourier transformation, which produced time & frequency domain measures of HRV. The difference in HRV measures among three states (baseline, exercise, recovery) was compared using Friedman test followed by Wilcoxon Sign Rank test. The data are expressed as median with interquartile range.

Results: The heart rate, as compared to baseline, increased during exercise and decreased but remained high during recovery (67.9[60.21-70.58] vs. 121.2 [118.73-125.43] vs. 73.03[65.83-78.57] bpm, all three p values<0.01). However, the total power of HRV decreased and then resumed in recovery (3075[1780-3885] vs. 702[415.5-1052] vs. 4528[2220-6213] ms², both p values <0.01). Both the time and frequency domain vagal indicators of HRV decreased during exercise and resumed in recovery: RMSSD (37.6[28.5-60.5] vs. 15.6 [13.1-21.1] vs. 55.4[34.3-81.4] ms, both p values<0.05), NN50 (50[23-142.5] vs. 8 [3.5-12] vs. 108[47.5-153] counts, both p values<0.05), PNN50 (15.9[6.7-43.4] vs. 2.3 [0.95-2.9] vs. 27.8[11.6-42] counts, both p values<0.05), and high frequency (561[235-1796.5] vs. 16[6.5-39] vs. 1051[381-3248] ms², both p values <0.01). The frequency domain sympathetic indicator of HRV: low frequency power (870[593-1053] vs. 74[31-80.5] vs. 1139[806-1460] ms², both p values <0.01) increased during exercise and resumed in recovery.

Conclusion: Sub-maximal exercise leads to almost doubling of heart rate. However, the vagal indicators of heart rate variability decrease by more than 33%.

Poster Session 2

Sympathetic Function Assessment for Academic Induced Stress in Undergraduate Medical Students

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Background: Stress can reduce the efficiency of healthy individuals and it has been shown in most of the physiological studies.

Objectives: The present study was carried out to assess stress and its effect on sympathetic nervous system during academic examination in medical students.

Methods: A total of 60 subjects were studied. There were 15 male and 15 female from 1st year and 15 male and 15 female from 2nd year to compare the result between gender and year level. Pulse rate, respiratory rate, body temperature and Galvanic skin response were taken before and during mental arithmetic task.

Results: There was highly significant difference in Pulse rate ($P<0.001$), RR ($P<0.001$), body temperature ($P<0.001$), GSR amplitude ($P<0.001$) and GSR latency ($P<0.001$) during examination. Among the parameters for GSR analysis, significant change was not observed in rise time and peak wave height but "A peak" showed significant difference of obtained waveforms. There was no significant difference between genders.

Conclusion: It was observed that academic examinations for medical students are stressful and produce changes in vital parameters which may affect their health and academic performance. Academics and examinations are one of the most powerful stressors in medical students.

Assessment of Prevalence of Depression Among Old Aged Males and Females of Karachi

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Background: Depression is a major global health concern. It is not a young age disease rather affecting more than 50% of elderly population in developing countries of the world.

Objective: Present study is designed to investigate prevalence of depression among the geriatric population of Karachi city and its major etiologic factors responsible for the clinical manifestations of the disease.

Methods: One hundred and eighty people (aged 60 years or above, including both genders) who were not previously diagnosed for depression have been selected to participate in the study. Beck Depression Inventory (BDI) and Geriatric Depression Scales (GDS) were used to assess the depression in these individuals. Participants also filled another questionnaire for the assessment of their socio-demographic profile. All participants were helped out with questionnaires and questions were translated into Urdu for their better understanding.

Results: Depression rate in present study was found to be relatively higher in females as shown by both scales. By considering the scores of BDI it has been concluded that elderly males have lower rate of depression as compared to females. Most of the males (80%) and females (57%) of this study have no sign of depression according to BDI. However GDS results showed that 49% male and 46% female participants of this study have mild depressive symptoms and 57% males and 65% females were depressed.

Conclusion: Financial crises, feeling of dependency, physical disabilities, being alone, not have any strong social or family support and low education level are the main reasons for elderly depression in females of Karachi city.

Cardioprotective Effect of Trigonella Foenum-Graecum (Fenugreek) Seed Powder Administration and Its Comparison with Atorvastatin in Experimental Animal Models of Hyperlipidemia

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Background: Lipid imbalances consider as the central dogma of coronary diseases. To treat lipid disorders both pharmacological and non-pharmacological therapies are available with emphasis on dietary interventions for primary cases of CAD.

Objective: Present study is designed to investigate the efficacy of dietary component fenugreek seed powder (FsP) consumption on dietary dyslipidemia and its comparison with atorvastatin.

Methods: 24 white rabbits of either sex were used in study. After one week acclimatization period, animals were randomly divided into two groups. Group I animals received normal diet. Group II animals were administered with atherogenic diet for four weeks. Group II is then subdivided as Group II-a: 10mg of FsP were fed daily to these hyperlipidemic animals for next 15 days and Group II-b: hyperlipidemic animals receive 0.5mg/Kg BW of atorvastatin for 15 days. At the end of experimental period blood specimens were obtained and assayed for alterations in plasma lipid profile (TC, TG, HDL, LDL, VLDL), atherogenic index, glucose, antioxidant enzymes (CAT, SOD, GSH), liver enzymes (AST, ALT) and plasma levels of urea & creatinine.

Results: Results showed that administration of fenugreek seed powder reduce plasma TC ($P>0.05$), TG ($P<0.05$). LDL-C ($P>0.05$), VLDL ($P<0.05$), AIP ($P>0.05$) and increase HDL ($P>0.05$) hence effectively control AIP. Glucose levels were also decreased ($P>0.05$), significant decrease in AST ($P<0.005$), ALT ($P<0.01$), urea ($P<0.05$) and creatinine levels ($P<0.005$). Fenugreek consumption significantly improve body antioxidant status by increasing plasma SOD ($P<0.005$), CAT ($P>0.05$) and GSH ($P<0.05$) in hyperlipidemic animals.

Conclusion: From obtained results it is suggested that daily supplementation of fenugreek seeds effectively reduces dietary hyperlipidemia and other risk factors of CAD.

Thyroid Status in Type 2 Diabetes Mellitus

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Background: Type 2 Diabetes Mellitus and Thyroid disorder are two most common endocrine disorders that affect major population worldwide. There is increasing evidence of developing thyroid disorder among Type 2 Diabetes Mellitus that is varying from 2.2% to 17%. Subclinical hypothyroidism being the most common thyroid disorder in Type 2 Diabetes Mellitus patients.

Objective: To observe serum Thyroid stimulating hormone, Thyroxine and Triiodothyronine levels in Type 2 Diabetes Mellitus patients.

Methods: This cross sectional study was conducted from July 2014 to June 2015 in the Department of Physiology, Rangpur Medical College, Rangpur. For this study, total number of 100 subjects were selected among them 50 non-diabetic healthy subjects were included in group-A (Control) and 50 Type 2 Diabetes Mellitus patients were included in group-B (Experimental). The subjects of group-A were selected from surrounding community of Rangpur district and subjects of Group-B were selected from Diabetic Association and from Outdoor of Endocrinology Department, Rangpur Medical College and Hospital, Rangpur. For statistical analysis independent sample "t" test was performed by computer based software SPSS- 17.0 version for windows.

Results: Serum Thyroid stimulating hormone was significantly higher ($P<0.001$) and serum total and free Thyroxine and Triiodothyronine levels were significantly lower ($P<0.001$) in Type 2 Diabetes Mellitus patients.

Conclusion: The serum Thyroid stimulating hormone level was higher and serum total and free Thyroxine and Triiodothyronine levels were lower are evidence of developed hypothyroidism in Type 2 Diabetes Mellitus patients.

Effects of Tobacco Consumption on Serum Glucose and Blood Hemoglobin A1c

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Background: The recent decades have been a massive global increase in tobacco use. In Bangladesh 43.3% of adults (41.3 million) use tobacco in smoking and or smokeless form. Immediate availability and the low price gives rise to high consumption of chewing tobacco and causes altered serum glucose levels and blood hemoglobin A1c level. Alterations of these parameters are leading to develop type 2 diabetes mellitus. Smoking may therefore be a modifiable risk factor for causing type 2 diabetes mellitus. The world health report (2003) concludes that consumption of tobacco products are the world's leading preventable cause of death in poor countries.

Objective: To observe the effects of tobacco consumption on fasting serum glucose level, serum glucose level 2 hours after ingestion of 75 gram glucose and blood hemoglobin A1c level in tobacco users.

Methods: This cross sectional study was conducted from July 2015 to June 2016 in the Department of Physiology, Rangpur Medical College, Rangpur. A total number of 150 subjects were selected, among them 50 were apparently healthy non-tobacco chewer non-smoker subjects (group A), 50 were apparently healthy tobacco chewer smoker subjects (group B) and 50 were apparently healthy tobacco chewer non-smoker subjects (group C). The subjects were selected from Rangpur district. For statistical analysis one – way ANOVA (post Hoc test) was performed by computer based software SPSS- 17.0 version for windows.

Results: Fasting serum glucose level, serum glucose level 2 hours after ingestion of 75 gm glucose and blood HbA1c levels were significantly higher in tobacco chewer smoker & tobacco chewer non-smoker subjects as compared with the healthy control subjects.

Conclusion: The higher fasting serum glucose level, serum glucose level 2 hours after ingestion of 75 gram glucose and blood hemoglobin A1c level in tobacco user are evidences of development of type 2 diabetes mellitus due to tobacco consumption.

"Wood Dust" – A Ailent Killer in Developing Country

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Background: Occupational and environmental lung diseases are the major problems of clinical medicine. Several occupations are associated with adverse health effects, and the lungs are the parts of the body most vulnerable to airborne hazards. Exposure to dust can lead to occupational lung diseases. The woodworkers are constantly exposed to high amount of visible ambient air particulate matter, but they work without any respiratory protective device. The inhalation of dusts over periods of time leads to proliferation and fibrotic changes in lungs.

Objective: To observe the effects of wood dust exposure on the lung functions by measuring FVC, FEV1, FEV1% and PEFr value by digital spirometer.

Methods: This cross-sectional study was conducted in the department of physiology, Rangpur Medical College, Rangpur from July, 2015 to June, 2016. Total 100 subjects were selected, among them 50 were apparently healthy experimental male workers exposed to wood dust aged 20-50. Age, sex, height, weight & BMI matched apparently healthy 50 male were control subjects not exposed to wood dust selected from surrounding community. Their pulmonary functions were studied by measuring FVC, FEV1, FEV1% and PEFr. For statistical analysis unpaired 't'-test was performed by computer based software SPSS-17.0 version for windows.

Results: The mean measured value and percentage of predicted value of FVC, FEV1 and PEFr were significantly ($p < 0.001$) lower in the experimental group than the control group. And there were no statistically significant differences in mean measured value and percentage of predicted value of FEV1 / FVC between two groups.

Conclusion: The mean measured value and percentage of predicted value of FVC, FEV1 and PEFr were significantly lower in male workers exposed to wood dust indicate lung functions impairment.

Ultrasound Integrated Teaching of Cardiac Cycle to Medical Students

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Background: Ultrasound is the most commonly used, safe, non-invasive, relatively cheaper imaging technique available in almost all medical college hospitals. It was initially restricted to certain medical specialties like Radiology, Gynecology and Cardiology only but now it is widely used by other specialties as well e. g., trauma and emergency, Surgery etc. There are many medical universities abroad who introduced first year medical graduates to ultra sound (US) techniques and noted its utility to understand the various physiological mechanisms.

Objective: Our objective was to study the utility of ultrasound to teach cardiac Anatomy and Physiology to first and second year medical graduates and to assess and compare their response to this novel technique in Indian scenario.

Methods: The study was conducted in two batches including the first year (66) and second year (38) medical students. After the brief introduction of US machine and its live images showing various structures of the heart, the students were asked to observe the cyclical changes occurring during each heart beat and to correlate them with ECG waves along with the heart sounds auscultated simultaneously. Then response was assessed with the help of five point Likert scale dedicated to their interpretation of various events of cardiac cycle and their correlation with ECG waves and heart sounds also the student's opinion was collected regarding utility and feasibility of this technique in understanding physiology of heart.

Results: Almost all students could appreciate the mechanical events of cardiac cycle within stipulated time cardiac cycle events was better in case of second year excepting correlation of ECG waves with mechanical events and more than 94% students strongly agreed that this method of teaching cardiac cycle by using ultrasound is definitely helpful.

Reference Values for Blood Pressure of Healthy Sri Lankan Tamil Children in Jaffna District

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Background: Ethnic specific Blood Pressure (BP) values are important to diagnose hypertension in children.

Objective: To establish reference norms for BP of Sri Lankan Tamil children in Jaffna district.

Methods: This is a population based descriptive cross sectional study among 6 to 18 year participants. They were selected by cluster sampling of class rooms. Height, weight, BMI, waist circumference, hip circumference and BP were measured. Tanner scale was used to mark pubertal stage. Ethical clearance was obtained from ERC, Faculty of Medicine, Jaffna.

Results: Participants were 950 boys and 972 girls. Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) of boys and girls increased from 98/70 and 99/70 to 107/73 and 107/73 until 10 years, decreased slightly up to 13 years (101/64 and 102/63) and increased until 18 years to 119/76 and 111/70. From the age of 15 years, boys had higher SBP and DBP than the girls ($p < 0.05$). The decline up to 13 years is difficult to explain. A normogram for BP was developed based on height percentiles. SBP had positive correlation with pubertal staging. All anthropometric parameters showed significant Pearson correlation ($P < 0.001$) with SBP. Mean SBP and DBP of boys and girls of 6 to 12 years (443 and 528) was $104 \pm 10/70 \pm 9$ and $104 \pm 10/71 \pm 9$ mm Hg respectively. The respective mean values for 13-18 year adolescents (507 and 444) were $111 \pm 13/69 \pm 10$ and $107 \pm 10/67 \pm 9$ mm Hg.

Conclusion: This study established reference values for BP of Sri Lankan Tamil children which can be used clinical practice.

Ankle Brachial Index (Palpatory Method) in Female Migraneurs

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Background: Migraine is a primary, chronic, intermittent headache characterized by unilateral severe pain attacks, associated with autonomic and gastrointestinal symptoms. It peaks in midlife causing disability. Females are affected three times more as compared to males. Genetic and acquired factors are suggested to be responsible. Migraneurs are reported to be at a higher risk of untoward vascular event especially in recurring prolonged cases. Vascular nature of migraine has been suggested with involvement of the blood vessels. In the present study, we aimed to determine if migraine alone was the cause of peripheral arterial disease if diseases affecting the blood vessels like diabetes, hypertension were excluded. Ankle brachial index (ABI) is the ratio of ankle systolic pressure to brachial systolic pressure. Its palpatory method is a simple non-invasive method to determine the condition of peripheral blood vessels. ABI is recommended to be used in asymptomatic subjects.

Objective: To determine and compare ankle brachial index in female migraineurs and healthy controls.

Methods: Study design: Comparative cross sectional study. Place and duration of study: This study was carried out at Postgraduate Medical Institute, Lahore, (Outpatient Department, Lahore General Hospital, Lahore) from April 2011 to October 2012. Subjects and methods: Eighty four females, aged 20 to 50 years were divided into three groups of 28 subjects each. Group A and B comprised of migraineurs with history of migraine for less than ten years and more than ten years respectively. Group C comprised of healthy controls. Ankle brachial Index was calculated after recording systolic pressures from brachial and dorsalis pedis arteries by palpatory method.

Results: Kruskal Wallis ANOVA test was applied to compare values of ABI in the three groups. Although within normal range, statistically significant difference was seen ($p=0.046$) among the three groups. Comparison of group B and C showed significant difference, ($p=0.010$).

Conclusion: ABI is within normal range in the three groups. Statistically significant difference exists between healthy females and migraineurs with history of migraine for more than 10 years.

Jagged1 in Combination with DNP Enhances Cardiac Angiogenesis and Regeneration Potential of MSCs

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Regenerative medicine assures safe alternative therapy for most of the degenerative diseases. These diseases are difficult to treat with conventional medicine and even surgical procedures involve larger risks of life and economical burdens.

Myocardial infarction, a leading cause of morbidity in world's population, is one of the important examples of such diseases. Angiogenesis; formation of new blood vessels, is an important physiological response after MI that allows the heart to regenerate. Bone marrow derived Mesenchymal stem cells (MSCs) are most considered candidates for therapeutic angiogenesis and cardiac regeneration. The present study was carried out to investigate the role of hypoxia pre-conditioning and genetic manipulation of MSCs for the over-expression of angiogenic factor Jagged-1 (Jag1) to improve their therapeutic potential.

MSCs were isolated from rat bone marrow and characterized through immuno-cytochemistry and flow-cytometry. Variation in the gene expression pattern of Jag1 was determined by RT-PCR after 20min hypoxic stress through 2,4-Dinitrophenol (DNP) treatment to MSCs followed by different time periods of reoxygenation. Rat animal models of myocardial infarction were developed through ligation of left anterior descending coronary artery and evaluated through echocardiography after 4 weeks of surgery. The animals' groups include normal, DNP treated, transfected and DNP treated-transfected. Echocardiography and histological examination were performed. Jag1 transfected MSCs when preconditioned with DNP exhibited the capability to regenerate the cardiac tissue and initiate angiogenesis. Newly developed blood vessels were prominent on the external surface of myocardium after dissection. These results suggest further investigation for the use of Jag1 transfected MSCs for cardiac regeneration.

Pulmonary Rehabilitation on Lung Functions and Exercise Tolerance in Stable COPD Patients

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Background: COPD is a morbid disorder where drug treatment along with pulmonary rehabilitation (PR) is known to be therapeutically useful.

Objectives: To evaluate the effects of breathing exercises (pursed lip breathing, PLB; diaphragmatic breathing, DB) and lower extremity endurance training (LEET), on lung functions and exercise tolerance, in COPD patients.

Methods: For this, 116 male (50-65yr), stable, moderate COPD (post bronchodilator FEV1/FVC% \leq 0.70 of PV and FEV1 \geq 50-79% of PV) patients were enrolled from the OPD of BSMMU and NIDCH, Dhaka. Of them, 56 were simply randomized to control (without PR) and 60 to experimental (with PR) group. The experimental patients were trained and advised to perform each component of PR program (PLB, DB, LEET) for 30 minutes duration/session/twice/day at home, for consecutive 60 days, along with standard drug treatment of COPD. All the patients were assessed for lung functions (FVC, FEV1, FEV1/FVC%, PEFr, FEV25-75%) and exercise tolerance (6 min walk distance, level of dyspnea level of fatigue) on day 1 and day 60.

Results: After 60 days of follow up, significant ($p<0.001$) improvements were observed in all the study variables (except FEV1/FVC%) in the experimental patients in comparison to their own pre-rehabilitation values. However these improvements in experimental group were statistically significant ($p<0.001$) just in 6MWD, level of dyspnoea and level of fatigue, when compared to the improvement in control patients.

Conclusion: This study reveals that, regular pulmonary rehabilitation has considerable beneficiary role on lung functions and exercise tolerance in patients with stable moderate COPD.

BDNF (Val66Met) Polymorphism and Depression in Pre-Menopausal Healthy Females: An Association Study

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Background: Depression is a complex psychiatric disease which is predominant in developing countries and might be under the genetic control. It may be caused by the mutation and polymorphisms in genes in which BDNF (Brain derived neurotropic peptide) polymorphism is one of them. The role of BDNF gene in depression and other neuropsychiatric disorder has been supported by epidemiologic studies.

Objectives: The purpose of this present study was to investigate the association of BDNF gene polymorphism with depression in premenopausal healthy females of Karachi, Pakistan.

Methods: This investigation was done in Karachi, Pakistan from Jan 2014 to Dec 2014. Totally, 190 healthy females with age range 18-45yrs were included. All subjects were screened for the depression using Zung's depression scale and DSM IV criteria and classified into two categories depressed and Normal. Genomic DNA was extracted from blood samples by proteinase K method and genotyping for the BDNF (Val66Met) polymorphism (G>A; rs6265) was determined via PCR-RFLP analysis among depressed and normal subjects. The association of mutant (polymorph) genotype and Depression among depressed and normal subjects was analyzed through Chi Square analysis which was done on SPSS 22 at significant level P-value < 0.05.

Results: The statistical analyses revealed significant association in genotype frequencies ($\chi^2=6.614$, P-value=0.037) of BDNF val66met polymorphism among depressed and non-depressed healthy participants.

Conclusion: Val66met polymorphism is associated with the risk of depression in premenopausal healthy females of Karachi, Pakistan.

Factors Associated with the Prevalence of Anemia Among Students of University of Sindh, Jamshoro, Pakistan

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Anemia remains the problem of concern worldwide, particularly in the developing countries where number of factors cause an increase in prevalence of anemia. Anemia is prevalent in all age groups, being more common in female adolescents, and young adults. Number of studies suggests higher prevalence of anemia in University Going students, however, little is known about prevalence of anemia in university students of Pakistan. The purpose of this study was to assess the factors associated with prevalence of anemia among university students. Data was obtained through structured questionnaire regarding dietary habits, socio demographic and other contributing factors of anemia from January 2014 to August 2014. Hematological parameters were obtained by blood analyzer. Results: Our findings show that female students have significantly higher percentage ($P < 0.05$) of anemia than male students. Students who belonged to the urban areas were more anemia than students from rural areas. BMI less than 18.5 was significantly associated with anemia ($P < 0.05$) particularly in female students. In diet, the major factor was Milk and dairy product; the students who were taking milk after meal had significantly higher Odds of anemia ($P < 0.05$). In conclusion, higher prevalence of Anemia was found in female students, the students who were living in urban areas, the students have lesser BMI and the students taking Milk after meals.

Functions of Sox3 as Transcriptional Repressor

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Sox3 is the member of HMG domain containing DNA-binding transcription factors. Sox3 is expressed at the early stages of development in vertebrates playing a key role in maintaining neural progenitor cells. Mutations in Sox3 gene have been linked with Mental Retardation and Growth Hormone deficiency. Sox3 acts as a bi-functional transcription factor, which can activate and repress genes in various cellular contexts. The mechanism by which Sox3 activates certain genes and represses others is not understood. The purpose of this study is to find out the mechanism by which Sox3 can act as repressor. Using Nuclear Translocation Assay We have provided evidence that Sox3 interacts at the at the N-terminal domain of the Grg proteins. Mapping shows that the C-terminal part of Sox3 contains at least two interaction motifs, which are sufficient to mediate interaction with Grg proteins. Our other strategy was to determine if Sox3 can act as repressor by undergoing post-translation modification such SUMOylation. SUMOylation has been shown to alter the transcriptional activity of many transcriptional factors. WE provide the evidence that Sox3 SUMOylated form of Sox3 is exclusively detected in the chromatin fraction, and gain of SUMOylation function appears to convert Sox3 to a repressor. Collectively, Our data reveal that an interaction of Sox3 with the Grg family of corepressors and SUMO modification of Sox3 play a key role in altering the transcriptional activity of Sox3.

Hepatoprotective and Antioxidative Effects of *Allium sativum* Var Lehsun Gulabi on Acetaminophen Induced Acute Hepatitis in Male Albino Rats

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Background: Acute hepatitis results in massive necrosis of liver cells and impairment of liver functions. Acetaminophen toxicity is the most common cause of drug induced hepatitis, characterized by centri-lobular hepatic necrosis. The oxidative metabolite of acetaminophen, NAPQI (N-acetyl-p-benzo-quinone imine) is more toxic than the drug. Its conjugation with the sulfhydryl groups of glutathione depletes a natural antioxidant glutathione peroxidase (GPx). Scenario becomes complex while prescribing acetaminophen to a patient on anti-tuberculous or anti-convulsive drug therapy or in case of patients of renal failure, diabetes mellitus or chronic hepatitis. There is a need to detect a natural hepatoprotective product for hepatitis patients. The present study was planned to explore a natural and cheap hepatoprotective product for curing acute hepatitis and delaying its progression to hepatocellular carcinoma by evaluating antioxidant and hepatoprotective properties of Garlic – *Allium Sativum* Var Lehsun Gulabi, a variety of garlic commonly grown in Pakistan.

Objectives: The objective of this study was to determine the hepatoprotective and antioxidative effects of ethanolic extract of *Allium Sativum* Var Lehsun Gulabi on acetaminophen induced hepatotoxicity in male albino rats.

Methods: Study design: Randomized controlled trial (RCT). Place and duration of study: This study was conducted at Physiology department, Services Institute of Medical Sciences (SIMS), Lahore from August 2012 to February 2014. Subjects and methods: The study was carried out on 90 male albino rats. The rats were randomly divided into three groups of thirty each. Group A was given normal saline (control); group B was administered hepatotoxic dose (750 mg/kg) of acetaminophen intraperitoneally (negative control); group C (experimental) was pretreated with *Allium Sativum* Var Lehsun Gulabi extract for 7 days before receiving hepatotoxic dose of acetaminophen intraperitoneally (Experimental). Serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total proteins, albumin and glutathione peroxidase levels in each group were measured in terminal intracardiac blood samples taken 24 hours after acetaminophen administration.

Results: *Allium Sativum* Var Lehsun Gulabi extract manifested hepatoprotective and antioxidative effects by producing highly significant ($p=0.000$) reduction in serum ALT and AST, and significant ($p=0.015$) reduction in serum ALP levels. This garlic extract also produced highly significant increase in serum total proteins, albumin and glutathione peroxidase levels.

Conclusion: *Allium Sativum* Var Lehsun Gulabi has potent hepatoprotective and antioxidative potential.

Association Between Physical Activity and Serum Bilirubin Levels and Its Potential Modulating Effect in Trained and Untrained Adult Males

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Background: Studies over the last two decades had shown low levels of serum bilirubin association with high risk for varieties of systemic diseases in human (de Sauvage et al., 2011). We propose that one potential lifestyle to increase bilirubin levels is physical activity.

Objectives: The present study examined the association between physical activity and serum bilirubin levels and its potential modulating effect among trained and untrained adult males.

Methods: 20 trained and 20 untrained adult males participated in this study following inclusion and exclusion criteria. The university institutional review board (ABUTH/HREC/TRG/36) gave approval for all procedures in accordance with the Declaration of Helsinki. Blood samples were taken to measured serum total bilirubin and leukocyte counts respectively from all subjects at rest. The VO₂Max was estimated from a standard regression equation (Jackson et al., 1990)

Results: The VO₂Max, correlated positively with serum total bilirubin ($p < 0.0001$), in the untrained ($R^2 = 0.002, +0.045$) and trained group ($R^2 = 0.088, +0.297$) respectively. Leukocyte counts correlated negatively with serum total bilirubin ($p < 0.0001$), in untrained ($R^2 = 0.162, -0.403$) and correlated positively in trained ($R^2 = 0.032, +0.178$; $p < 0.0001$).

Conclusion: Physical activity was positively associated with serum bilirubin level among the trained males in an increasing trend. The positive association was linked to increase hemoxygenase-1 activity, the enzyme responsible for the conversion of biliverdin to bilirubin. The potential novel modulating effect of the bilirubin might be on inflammation process because we observed lower leukocyte counts in the trained compared to the untrained.

A way forward for teaching and learning of Physiology: students' perception on the effectiveness of teaching methodologies

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Objectives: To compare the perception of medical students on the usefulness of the interactive lectures, case-based lectures, and structured interactive sessions (SIS) in teaching and learning of Physiology.

Methods: A cross-sectional study was carried out from January to December 2012 at Bahria University Medical & Dental College, Karachi, which had qualitative and quantitative aspects, assessed by self-reported questionnaire and focused group discussion (FGD). The questionnaire was distributed to 100 medical students after completion of first year of teaching of MBBS Physiology. The data was analyzed using SPSS version 15. Differences were considered significant at p-values <0.05 after application of Friedman test. Responses of FGD were analyzed.

Results: All the teaching methodologies helped in understanding of precise learning objectives. The comprehension of structure and functions with understanding of difficult concepts was made best possible by SIS ($p=0.04$, $p<0.01$). SIS enabled adult learning, self-directed learning, peer learning and critical reasoning more than the other teaching strategies ($p<0.01$).

Conclusion: SIS involved students who used reasoning skills and power of discussion in a group to comprehend difficult concepts for better understanding of Physiology as compared to interactive and case-based lectures.

Renalase Levels and Its Polymorphism in Gestational Diabetes Mellitus

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Background: Renalase is considered as a novel candidate gene for type 2 diabetes.

Objectives: In this study, we aimed to investigate the relationship of serum Renalase levels and two gene polymorphisms of Renalase with gestational diabetes mellitus.

Methods: One hundred and ninety eight pregnant females (n=99 GDM; n=99 euglycemic pregnant controls) were classified according to the International Association of the Diabetes and Pregnancy Study criteria. Fasting and 2 hour-post glucose load blood levels and anthropometric assessment was performed. Serum Renalase was measured using ELISA whereas DNA samples were genotyped for Renalase SNPs rs2576178 and rs10887800 using PCR-RFLP method

Results: In an age matched case control study, no difference was observed in the serum levels of Renalase ($p > 0.05$). The variant rs10887800 showed an association with GDM and remained significant after multiple adjustments ($p < 0.05$); whereas rs2576178 showed weak association ($p = 0.030$) that was lost after multiple adjustments ($p = 0.09$).

Conclusion: We inferred a modest association of the rs10887800 polymorphism with gestational diabetes. Although GDM is self-reversible, yet presence of this minor G allele might predispose to developing metabolic syndrome phenotypes in near future.

Role of Fetuin-A and Beta Crosslaps in Bone Health

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Background: Over 90% of the Pakistani population being vitamin D deficient contributes tremendously to annually increasing trend of osteoporosis worldwide. Fetuin-A is one of the bone turnover markers which play a dynamic role in improving bone health. Similarly, serum beta Crosslaps (CTx) is a sensitive marker of bone resorption.

Objectives: This study aimed to correlate serum levels of Fetuin-A and CTx with bone health in healthy females.

Methods: Total of 115 females of ages between 20 to 60 years were recruited in this cross-sectional study from Jinnah Postgraduate Medical Centre, Karachi. They were grouped as A & B on the basis of bone mass density (BMD) T score >-1 and <-1 , respectively. Anthropometric measurements were recorded and BMD was calculated by ultrasound bone densitometer (considering T-score ≥ -1 as normal). Serum was analyzed for bone minerals, Vitamin D, CTX and Fetuin-A. Data was analyzed statistically by SPSS 21, Mann-Whitney U test and Spearman's correlation (r) were applied where p value <0.05 was considered significant.

Results: The complete cohort showed normal calcium levels while a low level of vitamin D was observed ($P>0.05$). Interestingly, both serum Fetuin-A and CTx levels were found high in group B as compared to group A ($p<0.001$). Serum Fetuin ($r=-0.718$, $p<0.001$) and CTx ($r=-0.756$, $p<0.001$) depicted negative correlation with BMD % and BMI, while their levels were positively associated to each other ($r=0.481$, $p<0.001$).

Conclusion: Low values of BMD T-score (less than -1) are associated with high levels of Fetuin-A in our female population. Raised Fetuin-A in the presence of low vitamin D and high CTx, suggests that serum Fetuin-A does not reflect increased bone turnover. Further experiments are required to validate the role of Fetuin-A in bone mineralization.

Diastolic Function to Dysfunction: Modeling and Measurement in Coronary Artery Disease

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Background: Diastole is an energy dependent process. Myocardial ischemia is characterized by a decrease in ATP leading to incomplete sequestration of calcium and incomplete actin-myosin dissociation, steps critical to myocardial relaxation and ventricular filling.

Objectives: As diastolic dysfunction (DD) and coronary artery disease (CAD) are closely interrelated, we aim to assess the status of DD in patients with advanced CAD admitted for revascularization therapy.

Methods: Retrospective analysis of advanced CAD patient records admitted for coronary artery bypass operation was done. Patients were divided into groups I and II with ejection fraction (EF) $\geq 50\%$ and $< 50\%$ respectively. Echocardiography records were used to assess cardiac morphology, systolic and diastolic functions.

Results: Groups I and II showed body mass index of 29 kg/m² vs 25 kg/m² and frequency of hypertension 80% vs 63% respectively. Electrocardiogram showed higher rate (47%) of ST-Elevation Myocardial Infarction in group II and Non ST-Elevation Myocardial Infarction (NSTEMI) (27%) in group I. Group I showed E/e' ratio of 13 against 17 in group II. There was an inverse correlation between Ejection Fraction (EF) and E/e'. 33% patients with DD and preserved EF presented with and 67% without heart failure symptoms.

Conclusion: In patients with advanced CAD, severity of DD increases progressively with reduction in EF. Patients with preserved EF and DD had associated symptoms of heart failure. Therefore, diastolic function status in patients with advanced CAD requires attention and action irrespective of their EF status. The significance lies in the fact that DD exists despite the normal EF that is taken as a measure of cardiac function.

Impact of Learning Approaches on Performance of Medical Students

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Objectives: To identify best assessment method; multiple choice questions (MCQs), short answer questions (SAQs), objective structured physical examination (OSPE) and problem based learning (PBL) for medical students with different learning approaches.

Methods: The cross-sectional questionnaire-based study was conducted in Bahria University Medical and Dental College, Karachi, Pakistan. The questionnaire was tailored from ASSIST inventory, on a five point scale (1 = disagree, 2= somewhat disagree, 3=unsure, 4=agree somewhat, 5 = agree). Deep approach (DA) was obtained by five sub scales (20 Items); Seeking Meaning , Relating Ideas , Use of Evidence , Interest in Ideas and Supporting Understanding for teaching preferences. Surface apathetic approach (SAA) included; Lack of Purpose, Unrelated Memorizing, Syllabus Boundedness, Fear of Failure combined with Transmitting Information. Strategic approach (SA) comprised of five sub scales; Organized Studying, Time Management, Alertness to Assessment, Achievement to Motivation and Monitoring Effectiveness. Response to questions was summed for subscales and main scales for LA. Mean scores for aggregate marks obtained by MCQ and SAQ, PBLs and OSPE were derived. Coefficient of variation was estimated to find the most reliable assessment methods.

Results: Out of 98% response rate, 51 (52%) were girls and 47 (48%) boys. Majority students (71.4 %) displayed SA, and minimum 13.3% were SAA.OSPE had least variation (12.27) for all approaches whereas maximum variation (14.92) was observed by PBL scores.

Conclusion: Assessment by PBL scores was able to demarcate deep learners whereas consistent scores of all learners obtained by OSPE failed to discriminate variance in performance by different learners.

Impact of Exclusive English Language Use in Physiology Lecture on Students' Physiology Learning

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Background: Medical students of Bangladesh have to encounter English as a learning media. But teachers usually do not use English exclusively in their lectures thinking that students may not be able to understand.

Objectives: To assess the impact of exclusive English language use in physiology lectures on students' performance.

Method: This comparative study was conducted in the Department of Physiology, Noakhali Medical College, Bangladesh during the period of August, 2013 – November, 2013. Permission was taken from concerned authorities. One hundred and sixteen MBBS students of two sessions of a selected government-run medical college of Bangladesh were enrolled for the study by purposive sampling. Exclusive English was used in physiology lectures of 1st term course for the students of 2012-2013 session and were grouped as 'group A' and the same lectures were delivered in mixed language of English and Bengali for the students of 2011-2012 session and were designated as 'group B'. Data on admission merit-score and first term marks were collected in a questionnaire. Data were analyzed by using SPSS version 16. The marks obtained by two groups were compared by unpaired Student's 't' test and success rate was compared by chi-square test. P value <0.05 was considered significant. 95% CI was calculated.

Result: There were 31% male students in group 1 and 51.7% in group 2. The admission score of group A was significantly higher than group B (163.48 ± 1.75 vs 151.55 ± 1.52 , $p < 0.001$, 95% CI, 11.32-12.54). The students of group A obtained significantly more marks than group B, both in written (51.77 ± 8.37 vs 43.41 ± 3.82 , $p < 0.001$, 95% CI, 5.80-10.90) and oral (70.88 ± 8.14 vs 45.91 ± 4.40 , $p < 0.001$, 95% CI, 9.18-14.31) examinations. In group A, 23 (39.7%) students passed, 29 (50.0%) failed and 6 (10.3%) were absent and in group B, 24 (41.4%) students passed, 27 (46.6%) failed and 7 (12.1%) were absent. However there was no significant difference in success rate ($p = 0.919$).

Conclusion: The students who attended the lectures delivered with exclusive English obtained more marks than the students who got the lectures delivered with mixed English and Bengali. However, the success rate was similar in both the groups.

Student's Perception of Educational Environment in a Private Medical University

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Objectives: To compare student's response assessed by Dundee Ready Educational Environment Measure (DREEM) on the basis of year of study, gender and pre-medical educational background at Aga Khan University Medical College (AKUMC).

Methods: A cross-sectional survey of students was carried out at AKUMC from June 2014 till March 2015 to collect responses of students on items of DREEM questionnaire. The average scores of DREEM scales and subscales were compared between gender and educational background using Mann-Whitney U test. Kruskal Wallis compared the responses on the basis of year of study, significant difference considered set at <0.05 .

Results: Total DREEM score of females and students with higher secondary school (HSC) background was significantly better as compared to males and students in British General Certificate of Education (GCE) background, respectively ($p < 0.0001$, $p = 0.017$). Female medical students were satisfied with the atmosphere of teaching, learning and element of social self-perception. Year-wise comparison showed significantly better DREEM score responses by fourth year students.

Conclusion: The comparison of DREEM scale and sub-scale scores on the basis of year of study, gender and educational background provided valuable information to curriculum planners and decision makers at AKUMC with regards to strengths and areas of improvement.

Effect of Slow Breathing Exercise on Cardiac Autonomic Nerve Function in Migraine Patients

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Background: Migraine is associated with autonomic dysfunction. However, slow breathing exercise (SBE), a yoga relaxation technique, has good impact on cardiac autonomic function in health.

Objectives: To observe the effect of SBE on the cardiac autonomic function in migraine patients.

Methods: This prospective intervention study was carried out in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU) during 2014. Sixty newly diagnosed migraine patients, aged 15-30 years of both sex were assessed by heart rate variability (HRV) for autonomic nerve function. Thereafter, 30 patients performed SBE for 3 months whereas 30 patients were under medication only and also were followed up for 3 months. Thirty Age, sex, BMI matched healthy subjects were control. The patients were selected from the out-patient department of Neurology, BSMMU, Dhaka. HRV data was recorded by Polyrite D of RMS India. Data of patients were recorded before and after 3 month with SBE and medication. For statistical analysis, ANOVA, paired sample and independent sample t-test were used.

Results: At base line, resting pulse rate, mean HR, LF norm and LF/HF were significantly higher and mean R-R, SDNN, RMSSD, variance, HF norm were significantly lower in all patients compared to control. After 3 months, all these values were further changed in same direction in patients without SBE. But these were improved after 3 months of SBE in migraine patients.

Conclusion: Autonomic dysfunction characterized by reduced vagal and accelerated sympathetic activity may occur in migraine patients. This dysfunction may worsen with time but SBE may improve cardiac autonomic nerve function in migraine.

Respiratory Function of Rice Millers in Anuradhapura District, Sri Lanka

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Background: Rice is the most important crop cultivated in Sri Lanka and rice milling is the largest agro-based industry in the country.

Objectives: The general objective of this study was to identify and quantify the effects of inhalation of rice husk dust on the respiratory function of rice millers in Anuradhapura district, Sri Lanka.

Methods: Rice millers (male: 84, female: 84) and controls (male: 84, female: 84) were selected and matched for determinants of lung functions, including smoking pack year index. Data were collected via a validated respiratory symptom and occupational history questionnaire, physical examination and spirometry. Those with known cardiac or pulmonary diseases were excluded from the study.

Results: Rice millers, irrespective of gender, had significantly lower mean Forced vital capacity (FVC), Forced expiratory volume in the first second (FEV1) and (Peak expiratory flow rate) PEFV values ($p < 0.05$) and increased prevalence of respiratory symptoms when compared with controls. Among millers, 42% of males and 38% of females had features of chronic respiratory disease. The mean FEV1/FVC ratio was significantly higher among male millers, while the mean Average mid expiratory flow rate (FEF25-75%) was significantly lower among female millers, than their respective controls. Exposure to the dust over a few hours caused significant reductions in FVC and FEV1 in female millers.

Conclusion: Observed deficiencies in lung functions of rice millers were probably caused by occupational exposure to rice husk dust. Wearing face masks, worker education and adequate ventilation in mills are recommended.

Specific Antivenom Ability in Neutralizing Hepatic and Renal Changes, 24 Hours After Latrodectus Dahlia Envenomation

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Background: Latrodectism, a syndrome caused by *Latrodectus* genus, is one of the clinical problems that occur predominantly in north east of Iran. Nowadays antivenom therapy has become the most useful treatment for animal bites; however there is still a controversy about route and time of antivenom administration in spider bite.

Objectives: The aim of the present study was to determine the efficacy of specific antivenom in neutralizing hepatic and renal symptoms, 24 h after *Latrodectus dahlia* envenomation.

Methods: We selected a group of male New Zealand white rabbits, weighing 2 ± 0.3 kg. The *L. dahlia* venom (0.5 mg/kg) was injected subcutaneously. Specific antivenom (2.5 ml, I.V) was injected 24 h following venom injection. Blood sampling was performed before and 24 h after venom injection, as well within 24, 48 and 72 h after antivenom administration. Serum levels of (aspartate amino transferase (AST) alanine amino transferase (ALT), alkaline phosphatase (ALP), urea, bilirubin, creatinine and albumin were determined in all the same.

Results: *Latrodectus dahlia* venom caused significant increase ($P < 0.05$) in all foresaid serum parameters. Antivenom reversed the AST, ALP, creatinine, urea and bilirubin to normal levels, but failed about ALT level, also non- significant decrease was observed in albumin levels.

Conclusion: Antivenom administration, 24 h after venom injection can greatly reverse symptoms caused by venom. Future studies in human beings should be conducted to assess the protection against the specific-*Latrodectus* antivenom.

The Acute Effects of Yoga Based Guided Relaxation on Cardiac Autonomic functions in Young and Healthy Yoga Naïve Volunteers

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Background: Cardiovascular autonomic functions are subject to the negative influences of stress which bring about a reduction in heart rate variability (HRV). Yoga based relaxation techniques have been found to relieve stress as shown by an improved HRV. Reports are scanty on the acute effects of such techniques on yoga naïve individuals. This study assesses the acute effects of Yoga Nidra on HRV parameters in young, healthy, yoga naïve volunteers.

Objectives: To compare the acute HRV responses of Yoga Nidra relaxation with those of non-yogic supine rest.

Methods: Fifty two male medical students in the age group of 17-25 were divided into two groups: Yoga Nidra relaxation (YR, n=26) and supine rest (SR, n=26). HRV indices were recorded before and after both the interventions. Within-group and between-group comparisons of the HRV parameters were done.

Results: Significant changes from baseline were observed in both YR and SR conditions with increase in SDNN, rmssd, nn50, pnn50, LF(ms²), HF(ms²), TP(ms²) after the intervention, with YR condition additionally showing an increase in HFnu and a decrease in LFnu and LF:HF ratio ($p < 0.05$). There was no significant variation between both the conditions before the intervention ($p > 0.05$). After the intervention, significant increases in HF (ms²) and HF nu, and reductions in LFnu and LF: HF ratio were observed in YR condition ($p < 0.05$).

Conclusion: Yoga nidra might confer a better short term relaxation as compared to ordinary supine rest after a short burst of relaxation even in yoga naïve individuals.

Highlanders Shows Better Parasympathetic Reactivation After Exercise Than Lowlanders

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Background and objective: Many people live and work at altitude with no apparent adverse effects. Despite the successful adaptation, some differences do occur in the autonomic adjustment in highlanders compared to lowlanders. we aimed to study the cardiac autonomic adjustment in highlanders and lowlanders and to compared it.

Methods: The study was conducted on 29 healthy male subjects born and brought up at high altitude (approx. 2900 meters from sea level) and age and sex matched healthy lowlanders. Cardiac autonomic adjustment was assessed using Heart Rate Variability (HRV) during rest, step test and recovery.

Results: Resting heart rate was comparable between the groups however recovery heart rate were lower in highlanders ($p < 0.05$). The fitness score was higher in highlander compared to lowlanders. The HRV during rest and it's response to step test were similar in two groups. However, during recovery, SDNN was higher ($p < 0.05$) and LF/HF ratio was lower ($p < 0.05$) compared to rest in highlanders which was not significantly different lowlanders. While RMSSD, NN50, pNN50 and HF power failed to recover to resting level within five minutes in lowlanders while highlanders showed faster recovery with better parasympathetic dominance.

Conclusion: Highlanders completely recovered back to their resting state within 5 min from cessation of step test with parasympathetic reactivation however, recovery in lowlanders was delayed.

Mitigation of Arsenic Induced Ovarian and Uterine Disorders by Combined Action of Vitamin B12 and Folic Acid

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Objective: Hasty occurrence of arsenic pollution claimed the expansion of unique therapeutic assistance with noninvasive oral agent to fight against arsenic allied health hazards by swapping orthodox painful chelating therapy.

Methods: In the present study, we pursued to inspect the therapeutic efficacy of vitamin B12 and folic acid in the mitigation of arsenic induced ovarian and uterine disorders. Wistar strain adult female rats were supplied with sodium arsenite (As^{3+}) contaminated drinking water (0.4 ppm) in combination with vitamin B12(0.04 μ g and 0.07 μ g) plus folic acid [FA] (2.0 and 4.0 μ g) alone and or in combination respectively/100 g body weight/day for seven estrous cycles (28 days).

Results: Rats those experienced arsenic exposure, exhibited significant impairments in the steroidogenic status of ovary and circulating levels of LH, FSH and estradiol. Ovarian follicular degeneration was prominent from follicular atresia in response to arsenic treatment. Uterine degeneration was confirmed from a poor antioxidant profile as evident from a diminution in the activities of superoxide dismutase, catalase, and peroxidase along with abnormal increase in conjugated diene and malondialdehyde levels. Mutagenic uterine DNA-breakage and uterine tissue injuries were noticeable following As^{3+} feeding by the rats. All these ovarian and uterine injuries were totally or partially lessened by the co-treatment of these two B vitamins in arsenic treated rats.

Conclusion: The mechanistic action of vitamin B12 and folic acid in arsenic fed rats might be associated with the augmentation of antioxidant defense system, somewhat through the eradication of arsenic from the body with the involvement of S-adenosine methionine pool (SAM) as vitamin B12 and folic acid are two chief controllers of this pool.

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