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**President's Message**

It is my pleasure to send a message for the newsletter once again. The present executive committee of the PSSL is preparing for the annual sessions having gone through an eventful year. We conducted this year's regional meeting at the Dental Faculty Peradeniya and the Quiz competition in Jaffna. Many members travelled abroad for presenting their research and others will be going in future.

Many members won prestigious awards; others assumed respectable positions. While working with the others in the committee, I was amazed by the amount of work they do. On one side they were dedicated to the PSSL; when I was reluctant to take up the presidency, they promised that they would do all the groundwork, which made me enjoy the post of presidency from Jaffna. On the other side they are involved in other organizations with extremely busy schedules while contributing to their faculty undergraduate education as evident by many faculties sending students to Malaysian quiz competition where three Sri Lankan medical faculties proceeded to semifinals and achieved second, third and sixth positions. On top of this, PGDip in Physiology is progressing well.

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The PSSL became a member of the SAAP several years ago and obtained regional recognition for its members. The SAAP decided to make Sri Lanka as the host country last year as a result of the trust and goodwill developed by our members and an attempt to register at the SARC office in Colombo is underway. We are making arrangements to obtain membership in IUPS and developing relations with FAOPS that will bring international recognition to PSSL and physiologists in Sri Lanka.

At the beginning of this year, the committee discussed two local activities: one is to improve its research promotion activities to a higher level and the other is to regularize the membership register with current profile of the members. Even though there is some progress in upgrading the membership register, we could not progress with the other activity.

One idea that came up during discussions is the need to make the outcome of our research activities available to Sri Lankan professionals by publishing locally and ensuring that our people benefit from our research. On the other hand the research work can also be published, as is happening now, in reputed international journals for international consumption and also for the members to help secure their academic promotion.

The time has come for the PSSL to start publishing its own journal to go along with the physiological societies in many other countries. Also we have to work harder to get all members to contribute towards the development of the PSSL further to achieve a prestigious place nationally and internationally.

With best wishes,  
**Prof. K. Sivapalan,**  
*President, PSSL*



## PROFESSOR CARLO FONSEKA CHALLENGE TROPHY

Inter-Faculty Physiology Quiz -2015

Faculty of Medicine, University of Jaffna



First image: Inauguration ceremony (Prof K. Sivapalan the President of the PSSL, Dr. S. Balakumar the former Dean of the Faculty of Medicine Jaffna, Prof Vajira Weerasinghe, the present Dean of the Faculty of Medicine, Peradeniya and Prof Ashoka Dissanayake during the traditional lighting of the oil lamp); Second image: Students' participation in the Quiz Competition. *Cont. page 10.*

# Annual Scientific Sessions-2015 of the Physiological Society of Sri Lanka

The Annual Scientific Sessions of the PSSL will be held on 27th & 28th November 2015, Colombo, Sri Lanka. It will be held in the lecture theatre of the new building of the Faculty of Medicine, University of Colombo. Professor Mohan de Silva as the Chief Guest and the Professor Jennifer Perera as the Guest of Honour will grace the inauguration of the sessions at 6.30 pm on 27<sup>th</sup> November 2015.

## **K N Seneviratne Memorial Oration 2015**

Professor KN Seneviratne memorial oration titled "**Physiology in Transition - Challenges for the Future**" will be delivered by Professor Michael Sedgwick, who is a consultant neurophysiologist and Professor Emeritus of the University of Southampton, UK and a visiting professor to the Faculty of Medicine, University of Peradeniya. The oration will be held during the inauguration ceremony of the Annual Scientific Sessions at 7.15pm on 27<sup>th</sup> November 2015 at the same venue.

## **Valentine Basnayake Memorial Oration 2015**

Professor Valentine Basnayake Memorial Oration of 2015 titled "**Music: A Neurologist's Encounter**" will be delivered by Vidyajothi, Kala Shiromani Professor Nimal Senanayake an Emeritus Professor of the Faculty of Medicine, University of Peradeniya and a consultant neurologist of the Teaching Hospital Peradeniya. The oration will be held during the Annual Scientific Sessions at 9.00am on 28<sup>th</sup> November 2015.

## **A C E Koch Memorial Oration 2015**

Professor ACE Koch Memorial Oration of 2015 titled "**Lead and Cadmium as Male Reproductive Toxicants; the Known and Unknown**" will be delivered by Professor Sharaine Fernando, who is a Professor in Physiology attached to the Faculty of Medicine, University of Sri Jayawardenapura. The oration will be held at the end of the Annual Scientific Sessions at 4.30pm on 28th November 2015 at the same venue.

## **Program of the Inauguration Ceremony of the Annual Scientific Sessions -2015 at a Glance**

- 6.30pm: Procession, Lighting of the Traditional Oil Lamp & the National Anthem
- 6.40pm: President's Address by Prof. K. Sivapalan, *President, PSSL*
- 6.50pm: Address by the Guest of Honour – Prof. Jennifer Perera, *Dean, Faculty of Medicine, University of Colombo*
- 6.55pm: Address by the Chief Guest – Prof. Mohan de Silva, *Chairman, University Grants Commission*
- 7.00 pm: Presentation of the Awards  
*Professor KN Seneviratne Memorial Research Award for 2015*  
*Professor KN Seneviratne Memorial Award for Physiology 2015*
- 7.10 pm: Introduction of the Orator by Prof. K. Sivapalan, *President, PSSL*
- 7.15 pm: K N Seneviratne Memorial Oration 2015-  
"Physiology in Transition - Challenges for the Future"  
Professor Michael Sedgwick
- 8.00 pm: Vote of Thanks by Dr. Dilshani Dissanayake, *Secretary, PSSL*

# The Annual Scientific Sessions – 2015, the Programme at a Glance

## Saturday, 28<sup>th</sup> November 2015

The Annual Scientific Sessions will be held in the New Building Lecture Theatre of the Faculty of Medicine, University of Colombo. Registration starts at 8am and the procession starts at 8.45am.

- 09.00am-09.45am: **Valentine Basnayake Memorial Oration 2015**  
"Music: A Neurologist's Encounter" by Vidyajothi, Kala Shiromani Professor Nimal Senanayake
- 10.15am-11.15am: **Symposium on Reproduction**  
"Inter-cellular Physiological Interactions within the Ovarian Follicle" by Dr.Thilina S Paliwadana,  
"Maternal Bile Acids: A Barrier to Fetal Cardiac Health" by Dr.Asanka Jayawardena ,  
"Estrogen Action and Timing Hypothesis" by Dr.MDP Goonaratne,
- 11.15am-12.15pm: **Free Paper Session 1**
- 01.15pm-01.45pm: **KN Seneviratne Memorial Research Award presentation**  
"Where does Cognition Meet Vision? Neurophysiological Evidence for Attentional Enhancement of Visual Processing in the Primary Visual Cortex"  
Dr.Tharaka Dasanayake, Senior Lecturer in Physiology, Faculty of Medicine, Peradeniya
- 01.45pm-02.45pm: **Free Paper Session 2**
- 02.45pm-03.45pm: **Symposium on Metabolic Syndrome**  
"Metabolic Syndrome and Beyond" by Dr.Prasad Katulanda,  
"Metabolic Syndrome: Insights from the Ragama Health Study" by Dr.Sureka Chakrawarthy,  
"Pathophysiology of Metabolic Syndrome" by Prof.Sudheera Kalupahana,
- 03.45pm-04.15pm: **Award Ceremony**
- 04.30pm-05.15pm: **A C E Koch Memorial Oration 2015**  
"Lead and Cadmium as Male Reproductive Toxicants; the Known and Unknown"  
Prof.Sharaine Fernando

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## Annual General Meeting 2015

### Physiological Society of Sri Lanka

Annual General Meeting of the PSSL will be held on 28th November 2015 from 5.30 pm to 6.30 pm in the New Building Lecture Theatre, Faculty of Medicine, University of Colombo.

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Dear Members,  
Congratulations from PSSL

## Achievements

### Appointments

#### Professor Vajira Weerasinghe



Professor Vajira Weerasinghe, was elected as the Dean, Faculty of Medicine, University of Peradeniya from 2015. He became the 16<sup>th</sup> Dean of the Faculty. Currently, he is the Professor of Physiology of the Faculty of Medicine, University of Peradeniya, and a Consultant in Clinical Neurophysiology, Teaching Hospital Peradeniya. Professor Weerasinghe is a former President of the Physiological Society of Sri Lanka and was a Deputy Vice-Chancellor of the University of Peradeniya as well.

### Presidential Research Award Winners

The following members of the Physiological Society of Sri Lanka received Presidential Awards for research publication from His Excellency the President of Sri Lanka, Mr. Maithripala Sirisena, for excellence in scientific research in 2013 at the ceremony held on 18<sup>th</sup> November 2015 at Waters Edge Hotel, Sri Lanka.

#### Prof. Niranga Devanarayana



Prof Niranga Devanarayana is a Professor in Physiology of the Faculty of Medicine, University of Kelaniya. In September 2015, she received a PhD from the Faculty of Medicine, University of Amsterdam for the thesis titled "Epidemiological and pathophysiological aspects of abdominal pain predominant functional gastrointestinal disorders in children and adolescents: a Sri Lankan perspective".

#### Dr. Dilshani Dissanayake



Dr. Dilshani Dissanayake is a senior lecturer in Physiology attached to the Department of Physiology, Faculty of Medicine, University of Colombo.

#### Dr. Sajjiv Ariyasinge



Dr. Sajjiv Ariyasinghe, is a Senior Lecturer in Physiology and the Head of the Division of Physiology, Faculty of Dental Sciences, University of Peradeniya.

#### Dr. Deepthi C. de Silva



Dr. Deepthi C. de Silva is a Senior Lecturer in Physiology attached to the Faculty of Medicine, University of Kelaniya

#### Dr. Lakmali Amarasiri



Dr. Lakmali Amarasiri is a Senior Lecturer attached to the Department of Physiology, Faculty of Medicine, University of Kelaniya.

## The vagal connection: The link between gastro-oesophageal reflux disease and respiratory symptoms

W. A. D. Lakmali Amarasiri

*Department of Physiology, Faculty of Medicine, University of Kelaniya*

### **Abstract**

***Gastro-oesophageal reflux disease (GORD) precipitates airway hyper-responsiveness, decreases lung function and induces respiratory symptoms. Embryologically, the foregut and respiratory tract have a common origin. It is possible that inflammation in either leads to reflexes that manifest clinically as GORD or airway disease. GORD has been implicated in the worsening or occurrence of respiratory symptoms by reflux or reflex mechanisms. Microaspiration of refluxate damages epithelial cells causing an inflammatory response in the airways of patients with GORD. Independent of aspiration, most evidence points to the presence of an acid induced-oesophago-bronchial reflex that stimulates or aggravates respiratory symptoms. Evidence for this vagal-mediated reflex comes from acid perfusion studies that have demonstrated bronchoconstriction and vagal hyperactivity immediately after acid stimulation of the distal oesophagus. It could be, that this reflex triggers bronchoconstriction and inflammation in response to acid in the oesophagus, and that if microaspiration is also present the response is augmented. There is probably a role of anti-reflux therapy and anticholinergics to break the cycle of reflux-induced respiratory symptoms. This article describes this association and related Sri Lankan research.***

In the year 1892 Sir William Osler described asthma as "... a neurotic affection characterized by hyperaemia and turgescence of the mucosa of the smaller bronchial tubes and a peculiar exudates of mucin. The attacks may be due to direct irritation of the bronchial mucosa or may be induced reflexly, by irritation of the nasal mucosa, and indirectly too by reflex influences from stomach, intestines genital organs". Even though Maimonides in the 12<sup>th</sup> century is said to have spoken about the gut and airways in his *Treatise*

*on Asthma*, the above perhaps was the first published reference to a possible link between the airways and the gut. Although an association between GORD, which is excessive reflux of gastric contents into the oesophagus, and airway disease has been acknowledged for over a century, an increased interest has sprung up only in the past 30 years or so.

GORD is linked to respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), chronic cough, laryngitis, sinusitis and bronchiectasis. Treatment of GORD with proton pump inhibitors has been shown to improve respiratory symptoms.

Diseases such as asthma and COPD may first develop in a susceptible individual and then as time progresses and especially in severe disease, may increase the pressure gradient across the lower oesophageal sphincter (LOS) or disrupt the anti-reflux barrier and promote GOR. A bout of coughing or wheeze may precede episodes of reflux. Bronchodilator and steroid medication used in the treatment of respiratory disease precipitate GOR by delaying gastric emptying or lowering LOS pressure. Thereafter, reflux could aggravate further respiratory symptoms thereby causing a vicious cycle.

On the other hand GOR itself may predispose to respiratory disease. It has been suggested that initial episodes of reflux may induce acute oesophageal injury resulting in lowered LOS pressure, delayed acid clearing and subsequently more reflux. As reflux continues, aspiration may follow. Sensitization of the pulmonary tree causes the airways to become reactive to other stimuli which then results in bronchospasm.

The pathway for triggering gut and airway inflammation and respiratory symptoms is

thought to involve the vagal sensory nerves innervating the airways and lungs.

The human airways are innervated via the sympathetic trunks and vagus nerves that give branches to the pulmonary plexuses which lie anterior and posterior to the tracheal bifurcation and the main bronchi. These control bronchomotor tone, submucosal gland secretion, epithelial cell function, bronchial vascular tone and permeability and secretion from other inflammatory cells. At rest, the smooth muscles of the bronchi are tonically constricted due to reflex cholinergic parasympathetic activity.

The parasympathetic nervous system is the dominant neural pathway in the control of airway smooth muscle tone. It plays a prominent role in the control of breathing and Herring-Breuer reflexes, and also the responses to irritant or rapidly adapting receptor activation and airflow obstruction. Stimulation of cholinergic nerves causes bronchoconstriction, mucous secretion and bronchial vasodilation.

Stimulation of alpha-adrenoceptors in airways causes bronchoconstriction too. The parasympathetic nervous system also provides relaxant innervation through non-adrenergic non-cholinergic (NANC) nerves containing vasoactive intestinal peptide and nitric oxide.

There is minimal innervation of the airways by the sympathetic nervous system but there are abundant beta-adrenergic receptors expressed on airway smooth muscle, whose stimulation causes bronchodilation, inhibits mediator release from mast cells in airways and alters vascular permeability. Neuropeptides such as substance P, neurokinin A and calcitonin gene-related peptide present in nerve terminals in airways are also thought to have important modulatory effects on the neural control of airway function.

The chemoreceptors play a minor role in the healthy lung, but play an essential role in airway defence. One type is physiologically similar to the pain-sensing nociceptors that innervate somatic tissue and have the capacity to detect chemical stimuli associated with tissue injury and inflammation, e.g. the bronchopulmonary C-fibres that are activated by noxious levels of tissue distension, irritants such as acid, capsaicin,

cigarette smoke and inflammatory mediators such as bradykinin, prostaglandins and adenosine. Reflexes triggered by these fibres include cough, apnoea, reflex bronchoconstriction, mucous secretion and bradycardia. Another sensory fibre, the 'touch-sensitive' A delta-fibre is sensitive to rapid acidification and most probably leads to immediate respiratory symptoms. The more slow sensing C fibres are probably more important in inflammation.

There are nociceptors in the oesophagus too. When activated by irritants such as acid, ethanol or food containing capsaicin, they cause symptoms of GORD. Nociceptors in the airways and oesophagus are derived from the same ganglia of the vagus nerves and pathways of the sensory nerves of the nociceptors terminate in the same regions of the commissural nucleus of tractus solitarius in the central nervous system.

Acid is a noxious stimulus. Acid refluxing from the stomach can evoke action potentials in the vagal nociceptive sensory nerves in the airways, lungs and oesophagus and modulate sensory excitability. Acid also inhibits the vagal low threshold mechanosensors in the oesophagus that are responsible for the reflex regulation of oesophageal motor functions. This inhibition could result in reduced oesophageal clearance or reduced LOS function, thereby favouring further GOR. Both the lung and the oesophagus are innervated by tachykinin-containing afferent nerves that have fibres in the airway epithelia. Inhaled citric acid has been shown to cause dose-dependent increase in total pulmonary resistance. This response was abolished with tachykinin NK-1 receptor antagonists. The investigators noted a concurrent release of nitric oxide, a bronchodilator, which may explain why oesophageal acid does not always cause a bronchoconstrictive response.

**Microaspiration** of refluxate stimulates and damages epithelial cells releasing cytokines to cause inflammation and also stimulates sub-epithelial afferent nerve fibres in airways to increase vagal tone and precipitate respiratory symptoms. Some investigators hypothesize that esophageal acid, especially with proximal migration, results in the accidental inhalation of acid, which alters airway homeostasis. Neuroinflammation occurs with activation of

capsaicin-sensitive sensory nerves. Protons can activate these nerves, resulting in the release of tachykinins that, in conjunction with kinins, nitric oxide, oxygen radicals, and proteases, modulate airway inflammation. Airway protective mechanisms may not be able to neutralize the acid load in the airway epithelium, thus exposing it to injury.

Without aspiration, oesophageal acid reflux may cause an increase in vagal tone with stimulation of vagal reflexes. Bray first introduced the idea of this **vagally mediated oesophago-bronchial reflex**.

Oesophageal acid refluxate or volume distension of the lower oesophagus could stimulate nociceptors innervating the airways and oesophagus and by local axon reflexes, may transmit signals to their target tissues independently of the central nervous system (CNS). This is known as '**neurogenic inflammation**' by action of tachykinins released from the nerve terminals of these visceral nociceptors. Stimuli capable of eliciting this reflex include, acid, capsaicin, ethanol and substances such as bradykinin, substance P, neurokinin A and calcitonin gene releasing peptide. The other mechanism is triggered by stimulation of oesophageal receptors for pH, osmolality or pressure resulting in a vagal afferent response to the nucleus of the tractus solitarius in the mid brain.

#### ***The association between GORD and respiratory disease in Sri Lanka***

The prevalence of GORD symptoms in Sri Lankan asthmatics was found to be 59.4% and patients with GORD were found to report increased frequency of upper respiratory symptoms.

A laboratory study of 30 adult asthmatics revealed that on 24-hour ambulatory pH monitoring, the asthmatics had more GOR compared to non-asthmatic volunteers, of which more than 70% was distal oesophageal acid exposure. The asthmatics experienced respiratory symptoms during the recording and 82% of the respiratory symptoms experienced were preceded by reflux episodes. Cough was the commonest respiratory symptom reported, of which 92% of the coughs were reflux associated. A respiratory symptom was considered as associated with a reflux episode

if it occurred 2 minutes prior to or after a reflux episode.

Asthmatics also had a higher amount of proximal oesophageal acid exposure, which indicate aspiration of gastric refluxate into the airways. However, in those asthmatics who had abnormally high acid exposure in the proximal oesophagus only 11 (55%) experienced respiratory symptoms during the period of recording and there was no correlation of presence of respiratory symptoms with the amount of proximal acid exposure. Most of the reflux episodes in asthmatics occurred in the upright position more than in the supine position. Therefore current study findings indicate and support other studies that stated that it is unlikely that microaspiration plays a prominent role in inducing or aggravating respiratory symptoms. Studies elsewhere too failed to demonstrate an influence of abnormal proximal acid exposure on lung function. The present study reported that 50% of the 30 asthmatics who participated in the study complained of one or more respiratory symptom during the 24 hour period of recording. Of them, nearly 73% had abnormally high acid exposure in the distal oesophagus. This suggests that a reflux into the distal oesophagus was more likely to trigger a respiratory symptom than a proximal reflux. It could be that aspiration is a less frequent trigger of asthma than oesophago-bronchial nerve reflexes.

Evidence for this distal reflex mechanism has been accumulated by acid perfusion studies. Acid perfusion studies are performed to stimulate the distal oesophageal response to acid, without allowing the acid to reflux proximally thereby not allowing proximal aspiration. Previous studies have reported increase in airway resistance and decrease in FEV<sub>1</sub> following oesophageal acid perfusion. Several other studies demonstrated that oesophageal reflux increases bronchial reactivity. They also stated that the vagus nerve was important for this mechanism because this response to oesophageal acid was abolished with atropine pretreatment.

Our laboratory performed an acid perfusion study on 40 asthmatics with mild stable asthma who underwent spirometry and autonomic function testing immediately after perfusion with acid or saline in random order. There was significant



bronchoconstriction and heightened parasympathetic activity, though there were no significant differences in any of the parameters between subjects with and without reflux. We concluded that acid stimulation of the distal esophagus results in increased parasympathetic activity and concomitant broncho-constriction in asthmatics irrespective of their reflux state. This strengthens the hypothesis that GER triggers asthma-like symptoms through a vagally mediated esophago-bronchial reflex and encourages a possible role for anti-cholinergic drugs in the treatment of reflux-associated asthma.

In conclusion, there is evidence that the vagus nerve is involved in the direct vagally mediated reflex, the heightened bronchial reactivity mechanism and the microaspiration theory. Most evidence points to the presence of a vagally mediated reflex. Concurrent microaspiration would augment the response. There is probably a role of anti-reflux therapy and anti-cholinergics in the treatment of reflux-induced respiratory symptoms. However it should be noted that treatment of GOR in asthmatics treats a potential contributing condition, and not the disease itself. The interactions between these disease entities are very complex and respiratory disease outcomes with GOR therapy are difficult to interpret.

## References

1. Amarasiri LD, Pathmeswaran A, de Silva HJ, Ranasinha CD. Prevalence of gastro-oesophageal reflux disease symptoms and reflux-associated respiratory symptoms in asthma (2010). *BMC Pulm Med*. Sep 15;10:49. doi: 10.1186/1471-2466-10-49.
2. Amarasiri DL, Pathmeswaran A, Dassanayake AS, de Silva AP, Ranasinha CD, de Silva HJ (2012). Oesophageal motility, vagal function and gastroesophageal reflux in a cohort of adult asthmatics. *BMC Gastroenterol*. 12:140. doi: 10.1186/1471-230X-12-140.
3. Amarasiri DL, Pathmeswaran A, de Silva HJ, Ranasinha CD (2013). Response of the airways and autonomic nervous system to acid perfusion of the oesophagus in patients with asthma: a laboratory study. *BMC Pulm Med*. 13:33
4. Braman SS (2006). The global burden of asthma. *Chest* 130(1 Suppl): 4S-12S.
5. Bray GW (1934). Recent advances in the treatment of asthma and hay fever. *Practitioner* 34: 368.
6. Canning BJ, Fischer A (2001). Neural regulation of airway smooth muscle tone. *Respiration Physiology* 125(1-2): 113-27.
7. Canning BJ, Mazzone SB (2003). Reflex mechanisms in gastroesophageal reflux disease and asthma. *The American Journal of Medicine* 115 Suppl 3A: 45S-48S.
8. Chakrabarti S, Singh K, Singh V, Nain CK, Jindal SK (1995). Airway response to acid instillation in esophagus in bronchial asthma. *Indian Journal of Gastroenterology* 14(2): 44-7.
9. Fischer A, Canning BJ, Udem BJ, Kummer W (1998). Evidence for an esophageal origin of VIP-IR and NO synthase-IR nerves innervating the guinea pig trachealis: a retrograde neuronal tracing and immunohistochemical analysis. *The Journal of Comparative Neurology* 394(3): 326-34.
10. Hamamoto J, Kohrogi H, Kawano O, Iwagoe H, Fujii K, Hirata N, Ando M (1997). Esophageal stimulation by hydrochloric acid causes neurogenic inflammation in the airways in guinea pigs. *Journal of Applied Physiology* 82(3): 738-45.
11. Harding SM (1999). Gastroesophageal reflux and asthma: insight into the association. *The Journal of Allergy and Clinical Immunology* 104(2 Pt 1):251-9.
12. Harding SM, Guzzo MR, Richter JE (1999). 24-h esophageal pH testing in asthmatics: respiratory symptom correlation with esophageal acid events. *Chest* 115(3): 654-9.
13. Harding SM, Schan CA, Guzzo MR, Alexander RW, Bradley LA, Richter JE (1995). Gastroesophageal reflux-induced bronchoconstriction. Is microaspiration a factor? *Chest* 108(5): 1220-7.
14. Herve P, Denjean A, Jian R, Simonneau G, Duroux P (1986). Intraesophageal perfusion of acid increases the bronchomotor response to methacholine and to isocapnic hyperventilation in asthmatic subjects. *The American Review of Respiratory Disease* 134(5): 986-9.
15. Hu X, Lee JS, Pianosi PT, Ryu JH (2015). Aspiration-related pulmonary syndromes. *Chest*. Mar;147(3):815-23. doi: 10.1378/chest.14-1049.
16. Jung YH, Lee DY, Kim DW, Park SS, Heo EY, Chung HS, Kim DK (2015). Clinical significance of laryngopharyngeal reflux in patients with chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis*. Jul 15;10:1343-51. doi: 10.2147/COPD.S84337.
17. Kollarik M, Ru F, Udem BJ (2007). Acid-sensitive vagal sensory pathways and cough. *Pulmonary Pharmacology and Therapeutics* 20(4): 402-11.
18. Kollarik M, Udem BJ (2002). Mechanisms of acid-induced activation of airway afferent nerve fibres in guinea-pig. *Journal of Physiology* 543(Pt 2): 591-600.
19. Mazzone SB, Canning BJ (2002). Central nervous system control of the airways: pharmacological

- implications. *Current Opinion in Pharmacology* 2(3): 220-8.
21. Miłkowska-Dymanowska J, Białas AJ, Zalewska-Janowska A, Górski P, Piotrowski WJ (2015). Underrecognized comorbidities of chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis.* Jul 15;10:1331-41. doi: 10.2147/COPD.S82420.
  22. Muntner S (1968). Maimonides' treatise on asthma. *Diseases of the Chest* 54(2): 128-32.
  23. Ricciardolo FL, Gaston B, Hunt J (2004). Acid stress in the pathology of asthma. *The Journal of Allergy and Clinical Immunology* 113(4): 610-9.
  24. Ricciardolo FL, Rado V, Fabbri LM, Sterk PJ, Di Maria GU, Geppetti P (1999). Bronchoconstriction induced by citric acid inhalation in guinea pigs: role of tachykinins, bradykinin, and nitric oxide. *American Journal of Respiratory and Critical Care Medicine* 159(2): 557-62.
  25. Singh V, Aggarwal V, Bansal S, Nijhawan S, Chaudhary N (2000). Effect of intraesophageal acid instillation on airway reactivity in patients with asthma. *The Journal of the Association of Physicians of India* 48(6): 601-2.
  26. Theodoropoulos DS<sup>1</sup>, Ledford DK, Lockey RF, Pecoraro DL, Rodriguez JA, Johnson MC, Boyce HW Jr (2001) Prevalence of upper respiratory symptoms in patients with symptomatic gastroesophageal reflux disease. *Am J Respir Crit Care Med.* Jul 1;164(1):72-6.
  27. Undem BJ, Carr MJ (2002). The role of nerves in asthma. *Current Allergy and Asthma Reports* 2(2): 159-65.

### Professor Carlo Fonseka Challenge Trophy.....continued from page 2

The Third Annual Inter Medical Faculty Physiology Quiz organized by the Physiological Society of Sri Lanka (PSSL) was held in the Faculty of Medicine, University of Jaffna on 27<sup>th</sup> June 2015. Medical faculties from 8 universities in Sri Lanka (University of Colombo, University of Peradeniya, University of Sri Jayewardenepura, University of Kelaniya, University of Jaffna, Sir John Kotelawala Defense University, Rajarata University of Sri Lanka, and Eastern University of Sri Lanka) participated. Each team had five contestants and up to 15 supporters.

The 35<sup>th</sup> batch of medical students, the staff of the Department of Physiology and the office of the Dean of the Jaffna Medical Faculty jointly received the students and staff from other universities treated with hospitality. The Faculty provided the Hoover Auditorium and vehicles for local travelling of visiting students and staff. All academic staffs of the Faculty of Medicine, Jaffna and other universities were invited to observe the program. The program was well attended.

#### **Inauguration Ceremony**

The participants were served tea and snacks and the event commenced at 9.45 am with lighting of the traditional oil lamp and the National Anthem.

Prof. K. Sivapalan (President, PSSL) welcoming all teams and staffs briefly reminded the history of the Physiology Quiz in Sri Lanka and the role played by Prof. Chang Hwee Ming of the University of Malaya. Dr. S. Balakumar, (The Dean of the Jaffna Medical Faculty) expressed his pleasure of having members from all Faculties of Medicine in the Jaffna Medical Faculty making one objective of IRQUE project, the social harmony, a reality. Finally, Professor Vajira Weerasinghe read the message from the patron, Prof. Carlo Fonseka.

#### **Quiz**

Dr. Asoka Dissanayake (retired Professor of Physiology, University of Kelaniya) officiated as the Quiz Master. Dr. Piyusa Attapattu, a Senior Lecturer, University of Colombo (chairperson of the quiz committee) projected the questions after it is read by the quiz master. Initially both of them explained the proceedings and the rules to be implemented.

Three senior academics, not representing the universities of the contestants, functioned as judges to facilitate the quiz master. The team of judges included Prof. Vajira Weerasinghe, Prof. K. Sivapalan, Prof. Savithri Wimalasekara, Dr. Deepthi de Silva, Dr. Sudarshani Wasalathanthri,



Dr. Chandana Hewage and Dr. Dinithi Fernando. Dr. Ms. M. Balasubramaniam acted as the scorer and time keeper assisted by the demonstrators of the Department of Physiology, Jaffna.

Teams from all 8 Faculties participated in the preliminary round after drawing lots. The winning teams at the first round were Peradeniya, Jaffna, Sri Jayawardenepura and Kelaniya. The second round was won by the teams from Kelaniya and Jaffna.

At the competition for 2nd runner-up, both, teams from Sri Jayewardenepura and Peradeniya scored 70 each. It became necessary to use a tie breaker question. A member from University of Sri Jayewardenepura pressed the buzzer first but the answer was wrong. So the team from the University of Peradeniya became the 2nd runner-up.

The final round was between University of Kelaniya and University of Jaffna. University of Jaffna scored 50 and became the first runner up. University of Kelaniya scored 75 and declared as the winner of the Professor Carlo Fonseka Trophy for Physiology Quiz- 2015.



### The Cultural Programme

The medical students of 37th batch of the University of Jaffna staged a short cultural program with songs and a dance.



### Awards Ceremony

The President of the PSSSL awarded the certificates and the trophy for the Judges, participants and the winners. Also cash prizes were given as follows: Rs. 10,000/= for the 2nd runner-up, Rs. 15,000/= for the 1st runner-up and Rs. 20,000/= for the champions. The program ended with the vote of thanks delivered by Prof. Savithri Wimalasekara, which was followed by tea.



*Award of certificate to Dr. Asoka Dissanayake*

## Memories of PSSL



From left: Dr. Deepthi de Silva, Dr. Dilshani Dissanayake, Dr. Sajjiv Ariyasinghe, Prof. Niranga Devanarayana and Dr. Lakmali Amarasiri at the Ceremony of President's Awards for Research on 18<sup>th</sup> Nov 2015, Colombo.

## Upcoming Academic Events

[8<sup>th</sup> FAOPS Congress from November 22<sup>nd</sup> -25<sup>th</sup>, 2015, Bangkok, Thailand](#)

[Physiology-2016, from July 29<sup>th</sup> to 31<sup>st</sup> 2016, Convention Center, Dublin, Ireland](#)

[16<sup>th</sup> World Congress on Pain, from September 26<sup>th</sup> to 30<sup>th</sup>, 2016, Yokohama, Japan](#)

[38<sup>th</sup> IUPS World Congress "Rhythm of Life" from August 1<sup>st</sup> -5<sup>th</sup> 2017, Rio de Janeiro, Brazil](#)

### Contribute to the PSSL Newsletters by..

- A featured article,
- Reporting achievements of you and your colleagues,
- Reporting information and highlights on related academic events,
- Writing synopsis of speeches made at international academic events etc.

### Edited by

**Dr. Ranjith W. Pallegama,**

(Editor of the Physiological Society of Sri Lanka)

Division of Physiology, Faculty of Dental Sciences, University of Peradeniya

Contact: [rwpallegama@gmail.com](mailto:rwpallegama@gmail.com), 071-4460907