

# FAOPS NEWSLETTER

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## Editorial

Welcome to the 19th issue of FAOPS Newsletter. In this issue we have an article from Professor Masao Ito entitled: "Exploring new horizons of cerebellum research". Professor Ito, as a well-known and outstanding physiologist, is the founder of the RIKEN Brain Science Institute in Tokyo, founder of FAOPS and FAONS and other institutions which all have had great effect on development of neuroscience in the recent decades.

Professor Jin Sup Jung kindly provided us a report from the Korean Physiology Society, its activities and also its founders. This interesting report also presents photos of their officials from past to present. We hope this approach in the newsletter gives the physiologists from our member societies more profound information of these institutions.

And also we are presenting exciting news from our next FAOPS congress (2015) which shall be held in Thailand, under the theme: "Translational Physiology: Imagination, Inspiration and Innovation". Our host, Professor Chumpol Pholpramool has presented details of the programming and also inspiring photos of the country. Please don't forget to make your bookmark on November 22-25th, 2015 for this event.

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Finally, I would like to take this opportunity to wish you and your loved ones a very Merry Christmas and a Happy New Year!

**Saeed Semnianian MD PhD**

**The Editor**

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**Masao Ito, founder of the RIKEN Brain Science Institute, gives an account of his career as a pioneer of cerebellum research at the 'New Horizon of Cerebellar Research' symposium held at RIKEN.**



## Exploring new horizons of cerebellum research



The cerebellum is a region of the brain with a curious history. Most well known for its role in motor control, the cerebellum is today known to be involved in everything from cognition to emotion and language. Masao Ito, founder of the RIKEN Brain Science Institute (BSI), is famous as one of the pioneers in a research movement that has shed light on the deeper functions of the cerebellum.

It was to commemorate Ito's great contributions to brain science that the BSI hosted "The New Horizon of Cerebellar Research" symposium on 29 March 2010, featuring leading scientists discussing their latest findings on the cerebellum. Each from a different perspective, the presenters painted an intricate picture of cerebellar function and its complex relation to cognition

Richard Ivry of the University of California, Berkley introduced this picture with a review of many decades of research, establishing the cerebellum's involvement in a range of cognitive functions. Peter L. Strick of the University of Pittsburgh supplied evidence for this involvement through his studies using virus-tracing technology, which confirm the conception that the cerebellum is made up of functional modules each communicating along parallel channels with areas of the cerebral cortex.

On more conceptual ground, Chris Miall of the University of Birmingham identified a strong cerebellar role in the forward model-

ing and prediction of outcomes. This predictive model was given a more tangible form by Mitsuo Kawato of the Advanced Telecommunications Research Institute, whose group explores internal models of the cerebellum through robot experiments.

In his own presentation, Ito recalled his nearly 50 years of experience researching the cerebellum, stressing the importance of evolution in understanding the brain's capacity to handle movement and knowledge through common mechanisms. For his many years of tireless work, Ito was rewarded with a standing ovation by the audience in attendance, many of whom have built careers on the basis of his pioneering research. Ito recounts the story of this research in his own words below.

### **Unlocking the secrets of the cerebellum: a message from Masao Ito**

What is it about the cerebellum that so many researchers—including myself—find so fascinating? The answer is to be found in the many mysteries it promises to resolve. The brain is filled with intricate neuronal circuits, but the relatively simple, precise and geometrically exquisite circuits of the cerebellum are particularly intriguing. Those of us who study the brain believe that the cerebellum may provide the clues we need to attain our long-standing objective to decipher the meaning of the brain's neuronal circuits.

## FAOPS History: Exploring new horizons of cerebellum research

To do so would utterly transform our understanding of brain function.

The era in which I began my career in neuroscience, in the 1960s and 1970s, was one that saw rapid advances in this area of research. Neuronal circuits of the cerebellum were dissected in great detail, and the revolutionary Marr–Albus network models, today's most widely accepted theories of cerebellar function, were first proposed. I made my debut in this field with the finding that Purkinje cells, a class of large neurons in the cerebellar cortex, are inhibitory in nature. The title of the monograph where this finding was reported, "The Cerebellum as a Neuronal Machine" (Eccles, Ito and Szentagothai, 1967), conveys a sense of the spirit of that era.

These discoveries were followed by many more. Our group obtained the first evidence that Purkinje cells are equipped with a type of synaptic plasticity called long-term depression, which depresses the action of synapses that cause erroneous movement. Complex molecular processes underlying synaptic plasticity were also uncovered, and models of the functional modules that make up the cerebellum advanced to the extent that they are today successfully employed to reproduce learning of motor skills in robots.

A number of unexpected findings were also uncovered along the way. Among these is the discovery that only 3% of the 175,000 excitatory synapses on a single Purkinje cell are actually functional. This suggests that while all synapses are initially functional, the majority become long-term depressed through learning, the functional remainder being sufficient to form a specific receptor field for each Purkinje cell.

Another great surprise was the discovery, spotlighted at the New

Horizon of Cerebellar Research symposium, that the involvement of the cerebellum may go beyond motor control, to higher-level cognitive functions. Evidence for this involvement is found in a relatively recent evolutionary development, a region of the cerebellum that forms a loop connection with the headquarters of cognitive function—the cerebral prefrontal cortex. Many brain-imaging studies have since revealed that activation of the cerebellum is associated with non-motor cognitive activities such as language.

These discoveries demand that we reevaluate the long-standing dogma of the cerebellum to incorporate not only motor control, but also cognition. Furthermore, it is in learning that we find evidence for a connection between these two types of brain function: repetition of a particular pattern of thought enables us to learn the pattern and reproduce it intuitively, without conscious effort, just as we learn to execute patterns of movement without knowing in detail the motor control mechanisms involved. Many important cognitive functions, including language, intuition, inspiration and giftedness, can be attributed in this way to learning capabilities of the cerebellum.

The connection above suggests the possibility of a common mechanism underlying both motor control in the physical domain, and manipulation of knowledge in the mental domain. The implications of such a mechanism would be profound, touching on a fundamental proposition in science dating back to the time of Descartes that our physical brain embodies the conscious mind. The cerebellum thus holds the key to one of the innermost secrets in science, and one of the greatest mysteries of the brain.

## Contribute your news!

**Did your society host a conference or event?**

**Do you have a physiology meeting that would be of interest to other FAOPS members? The FAOPS e-newsletter is a perfect way to communicate your news with other members.**

**We are also interested in your suggestions for features or spotlights on research, on educational outreach, to be included in the FAOPS e-newsletter.**

**Submit an article – make sure to include photographs, if possible:**

**Submit news now.**

**The FAOPS e-newsletter publishes twice a year at December and June.**



# FAOPS interview: Professor Won-Kyung Ho

**First of all, I would like to have a brief introduction, especially your education (and personal) profile. Then please give detailed answers to the following questions:**

I was born in February 1958 in Seoul, Korea. I studied Medicine in Seoul National University College of Medicine, and obtained MD degree in 1982. But, I did not go for clinical training. I entered postgraduate course, and studied physiology to obtain PhD in 1986. I became Instructor in Chungbuk National University College of Medicine in 1986, and moved to Seoul National University College of Medicine in 1989, where I became Professor in 2002. Since 2011, I am a Director of Biomembrane Plasticity Research Center funded by Korean Ministry of Education, Science and Technology.

**1-What factors in your general life influence you most? How have your family influenced in your scientific work?**

I remember how much I was fascinated during science lessons in the middle school. It was like opening eyes to realize that nature is operated under the principles. I wanted to become a scientist since then, so it was the middle school science teacher who influenced me most.

**2- What factors influenced you the most in deciding to be a physiologist?**

When I was a young girl, the idea of being a scientist in my thought was like being a person like Einstein. Although I wanted to become a scientist, I was not confident about myself. So, I could not choose to go to Natural Science directly, but entered Medical School. In the first year in Medical School, we learned physiology, and I was fascinated once more to find that life is also operated under the same principles that operate nature.

**3- When did you start your career in scientific research and in what area?**

When I graduated Medical School, I had to choose between internship in hospital and PhD course. I did not hesitate to decide to enter PhD course in the Physiology Department, because I knew myself better by then. I knew that I could not be satisfied by using knowledge to help people. I knew that I had a strong desire to produce it.



**4- Could you describe your laboratory; i.e. the atmosphere, the staff, and the students according to their degrees?**

Department of Physiology in Seoul National University College of Medicine has 11 faculty members and four research groups, including neurophysiology, cardiovascular, smooth muscle, and cell physiology. Prof. Suk-Ho Lee and I lead Cell Physiology Laboratory, in which 2 postdocs and 12 PhD students are doing research. Each student has own research project. We have lab seminar once every week, where students present their research progress once in a month. I try to make the atmosphere that students

## FAOPS interview: *Professor Won-Kyung Ho*

can discuss freely and actively with me whenever it is needed, and junior students can be helped by senior students when they have practical problems in the laboratory.

### **5- When did you first begin thinking about being a scientist?**

I was at the age of 12 in the middle school, I dreamt of being a scientist. When I had to make a choice at the age of 23 for my future life, I felt that the dream of a young girl was still there. If I walked away from it, it became meaningless that I had it. I decided to go for it, to see whether it worth pursuing.

### **6- How many hours do you work per day? Can you describe how you spend your working hours? How do you manage your time over research, education, meetings, lecture, travel and professional consulting?**

I wake up about 6:30, have breakfast, do some exercise, and arrive in my office at about 9:00. I usually leave my office at 9:00 pm in the evening when there is no special appointment. When I do not have education duty, I spend most of my time for research, which means studying to make research plan, discussion with students for data analysis and research progress, and writing papers. I have found myself not good at multi-tasking, so I try to avoid other activities which may distract my attention from research.

### **7- What are the qualities that discriminate a prominent and successful scientists from less successful ones?**

I am not sure whether we can define such characteristics. Scientists are persons who seek truths about nature, and I do not want to accept the idea that we can be divided into successful and less successful ones.

### **8- What advice would you give young scientists for their future careers?**

When I look back, there were a lot of changes in terms of scientific development as well as research environment. Especially during the last 10 years, the changes were fast and great. I myself was struggling to accommodate with these changes, and I still am. To be earnest, I do not think I can predict future situations well enough to give advice to the young generation.

### **9- What do you consider to be your most important studies and contribution to physiology?**

I have been interested in regulation of ion channel and cellular excitability with a special interest with receptor-mediated signaling mechanisms. We published a series of papers concerning GIRK channel regulation by Gq/PLC coupled receptors (GqPCRs). We reported first direct evidence that PIP2 depletion is responsible for GIRK channel inhibition by endothelin or phenylephrine in cardiac myocytes. Since then, PIP2 depletion is considered as a major mechanism of inhibition of various kinds of ion channels by GqPCRs. However, we found that GIRK channel inhibition by muscarinic or metabotropic glutamate receptor stimulation in hippocampal neurons is not attributable to PIP2 depletion, indicating that ion channel inhibition by PIP2 depletion may occur in a restricted condition. Using various approaches, we demonstrated that ion channel inhibition by PIP2 depletion depends on diffusion kinetics of PIP2. Glutamate receptor stimulation is not attributable to PIP2 depletion. The degree and kinetics of PIP2 depletion at the location of ion channel, which are determined by diffusion kinetics of PIP2 and the distance between the ion channel and



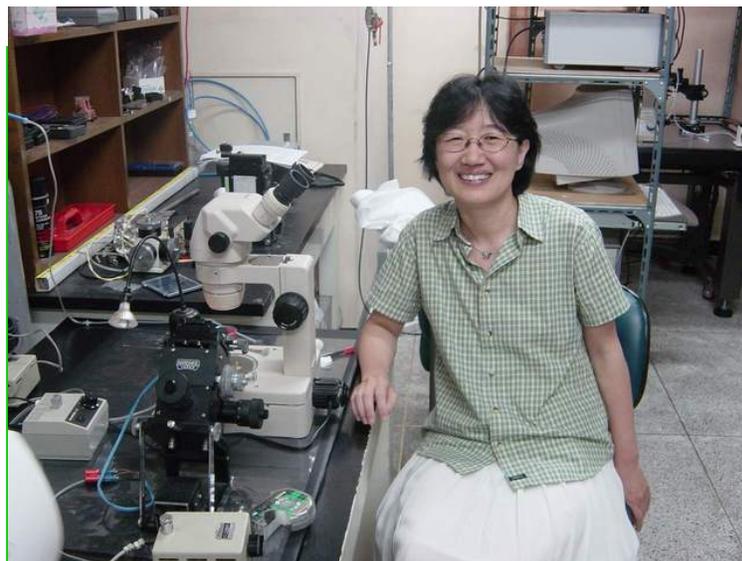
## FAOPS interview: Professor Won-Kyung Ho

GqPCR. However, I found that by GqPCR, a major mechanism of rsity College of Medicine. In the cell where PIP2 mobility in the plasma membrane is not free but restricted, microdomain of PIP2 depletion is formed in the vicinity of GqPCRs. In fact, PIP2 depletion is still proposed easily as a mechanism of channel inhibition by GqPCRs, but our studies the conditions whereby PIP2 depletion can play a signaling role. I extended my research on ion channel regulation in cardiac myocytes and neurons to pancreatic b-cells, and recently found an important signaling mechanism that regulates KATP channel trafficking. I presented recent results in FAOPS Congree last year, and hope to make a significant contribution to the field of ion channel trafficking.

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I have published 88 SCI papers so far, and major publications are as follows:

1. Impaired short-term plasticity in Mossy fiber synapses caused by mitochondrial dysfunction of dentate granule cells is the earliest synaptic deficit in a mouse model of Alzheimer's disease. *J Neurosci* 32(17):5953-5963, 2012
2. Glucose deprivation regulates KATP channel trafficking via AMP-activated protein kinase (AMPK) in pancreatic b-cells. *Diabetes* 58(12):2813-9, 2009
3. Decrease in PIP2-channel interaction is the final common mechanism involved in PKC- and arachidonic acid-mediated inhibition of GABAB-activated K<sup>+</sup> current. *J Physiol* 582.3:1037-1046, 2007
4. Receptor-specific inhibition of GABAB



-activated K<sup>+</sup> currents by muscarinic and metabotropic glutamate receptors in immature rat hippocampus. *J Physiol* 580.2:411-422, 2007

5. Low mobility of phosphatidylinositol 4,5-bisphosphate underlies receptor specificity of Gq-mediated ion channel regulation in atrial myocytes. *PNAS* 102(42):15241-15246, 2005

6. Receptor-induced depletion of phosphatidylinositol 4,5-bisphosphate inhibits inwardly rectifying K<sup>+</sup> channels in a receptor-specific manner. *PNAS* 102(12):4643-4648, 2005

I have graduated 2 postdocs, 5 PhD, and now have 6 students in the PhD course.



### FAOPS e-newsletter

- ⇒ **Pre- and post-graduate student applications:** Students looking for physiological research and clinical positions abroad
- ⇒ **FAOPS newsletter intends to facilitate the exchange of pre and post-graduate students within the Asian and Oceanic region.** To facilitate the exchange, FAOPS newsletter has opened a new category by the title: **"Student application"**
- ⇒ Pre-and post-graduate students are entitled to email an application (free of charge) to FAOPS newsletter for participating in a scientific and/or clinical setting abroad.
- ⇒ Team leaders are invited to browse through these applications and contact the students by email to host a foreign student in their institute.



# EAOPS Physiology Society: The Korean Physiological Society



대한생리학회  
Korean Physiological Society



1st KPS president:  
Gab Soo Lee, MD PhD

The Korean Physiological Society (KPS) was founded with 15 members from 6 medical colleges through the country in 1945, which was the year of Korea liberation from 36 years of Japanese occupation. The KPS has the longest history of establishment among the societies concerning basic medical sciences in Korea. Gab Soo Lee, MD, PhD was the first president. Today, the KPS embraces nearly 430 members, most of whom hold doctoral degrees in medicine, physiology or other health professions. The KPS has been involved in several activities such as promoting research, disseminating knowledge and advancing education in the field of physiology, and has facilitated comradery between our members.

The KPS is governed by an elected council consisting of the chairman of the board of directors, the chairman of the board of directors-elect for next term of the position, the president of the congress, the president of the congress-elect, 7 executive directors, 2 auditors and councilors. The president of the congress represents the society and the chairman of the board of directors is responsible for the management of the affairs of the society. Both are appointed by the council. The current chairman of the board of directors is Yang-Hyeok Jo, MD, PhD, a professor of School of Medicine, The Catholic University of Korea, and the current president of the congress is Byung-Il Min, MD, PhD, a professor of School of Medicine, Kyung Hee University. The KPS establishes 7 committees for the management of the society; administrative committee, scientific committee, publication committee, education committee, international committee, information committee, and planning committee.

The Korean Physiological Society (KPS) convened its first inaugural meeting in May of 1947, at College of Medicine, Seoul National University in conjunction with the Korean Medical Association.

The 64th Annual Meeting was held on October 24th-26th, 2012 in Busan. The meeting consisted of one satellite symposium (mitochondrial biology), Youdang Scholarship award lecture, 3 special lectures, 2 symposia including KOJACH symposium, 4 special focus sessions, 4 poster oral sessions and a poster session. About 250 abstracts were submitted and 450 attendees participated in the meeting.

The KPS publishes The Korean Journal of Physiology and Pharmacology (KJPP) in collaboration with Korean Society of Pharmacology bimonthly. The KJPP is available online (<http://www.ncbi.nlm.nih.gov/pmc/journals/972/>) for free. The articles are submitted online (<http://www.kjpp.net/submission/Login.html>). The KJPP is listed on PubMed and SCIE and the impact factor of KJPP has increase from 0.476 in 2010 to 0.964 in 2011.

The address of Society's office: # 1209 Doosan We've Centium Building, 158-4 Samsung-dong, Gangnam-Gu, Seoul, Korea 135-880.

Telephone: +82-2-568-8026; Fax: +82-2-568-8051

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e-mail: [physiology@koreaphysiol.org](mailto:physiology@koreaphysiol.org)



The Current Chairman of the board of directors, Yang Hyuk Cho, MD PhD

# FAOPS Physiology Society: The Korean Physiological Society



Current Chairman of congress  
Byung IL Min, MD, PhD

## Kojach symposium

KOJACH symposium, arranging initial two characters from Korea, Japan and China, was started by the Japanese Physiological Society in 2003 to promote collaborative activity among the Physiological Societies of three countries. The symposium had been held regularly in the annual meeting of the Physiological society of Japan (PSJ) between 2003 and 2009 by inviting Chinese and Korean Physiologists as guest speakers and co-organizers. In 2011 the KPS and the PSJ reached an agreement to have the KOJACH symposium regularly in the annual meeting of each Physiological Society. According to the agreement, the KOJACH 2012 symposium was held in conjunction with the 64th KPS annual meeting. The KOJACH 2013 symposium which is hosted by the PSJ will be held in Tokyo.

## The list of KPS executive directors

Directors	Name	Affiliation
Academic Affairs	Sang Jeong Kim	College of Medicine, Seoul National University
Director, General Affairs	Duck-Joo Rhie	College of Medicine, The Catholic University of Korea
Director, Scientific Publications	Hee Chul Han	College of Medicine, Korea University
International Affairs	Jin-Sup Jung	School of Medicine, Pusan National University
Information & Public Affairs	Min-Sun Kim	College of Medicine, Wonkwang University
Education & Member Development	Duck-Sun Ahn	College of Medicine, Yonsei University
Planning & Decision Support	Jaehee Han	College of Medicine, Gyeongsang National University

## Other activities of KPS

The KPS develops the learning objectives of medical physiology and publishes the laboratory manual in medical physiology to support the education of undergraduate medical students.

## Youdang Fellowship award

Youdang fellowship award was established in 2010 with a donation from Earm Yung E, an emeritus professor at the department of physiology, College of medicine, Seoul Nation University, of whose nom de plume is Youdang. The selection committee annually chooses an awardee from the nominated KPS members by considering the excellence in their domestic research for the last 3 years. The recipient receives the prize money of 5,000 thousand Won (about 4,500\$) and give a special lecture in the KPS annual meeting as part of the award. The recipient of the 2012 award was Seog Bae Oh, the college of dentistry, Seoul National University.

# Future Congress: FAOPS Congress 2015-Thailand

## 1st Progress report by Professor Chumpol Pholpramool



The Physiological Society of Thailand (PST) is now preparing for the 8th FAOPS Congress to be held in 2015. Local Organizing Committee (LOC) has been formed and Professor Chumpol Pholpramool received the consensus from PST members to chair. An International Organizing Committee consisting of FAOPS Council members and some key persons will be set in due course.

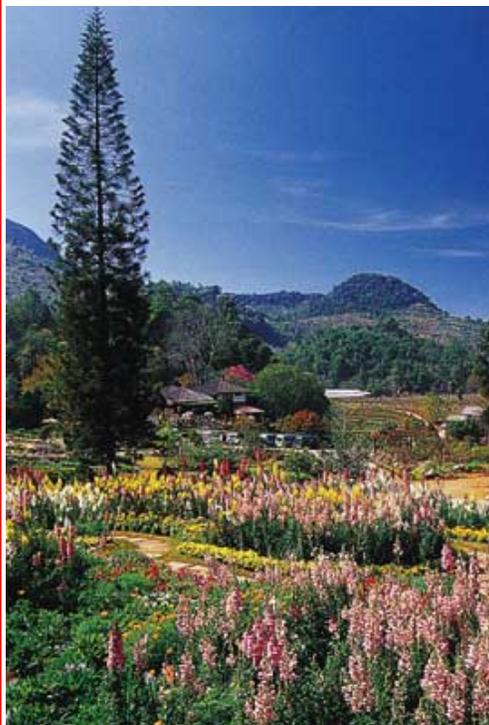
Feedback obtained from the previous Council meeting in Taipei regarding the congress venue has been reconsidered. LOC finally agrees to move the congress to Bangkok. However, the venue has not yet been finalized at this stage since it has to be carefully considered. The date of the congress is confirmed in late (22-25) November as previously proposed. At this time of the year, the

weather in Bangkok is mild and dry. Especially, we plan to have a farewell dinner on the famous Thai floating lantern festival on the full moon evening of the 12th lunar month. For those who attended the 1st FAOPS Congress in Bangkok in 1986, we hope they recall a memorably evening taken place on the same festival.

Regarding the scientific program, it will be organized under the theme "Translational Physiology: Imagination, Inspiration and Innovation".

Renowned physiologists and world class scientists will be invited to give plenary and special lectures. A number of named lectures in honors of our eminent physiologists and/or sponsored lectures are proposed. In a few months time, invitations for symposium proposals will be launched to member societies and individuals as in the previous congresses. We expect to accommodate as many as 20 symposia in various topics that fall within the theme of the congress. Pre and/or post congress satellite symposia are also welcome. Of course, a session(s) devoted to physiology teaching will be included. Besides, we plan to set up sessions of debates on unsettled issues in physiology research/teaching. We hope the scientific program will be enlightening and interesting to all participants.

To implement the important objective of FAOPS in promoting the advancement of physiology research in the region, a good numbers of travel awards will be granted to young physiologists who submit merit abstracts for presentations at the congresses. We wish



# Future Congress: FAOPS Congress 2015-Thailand

to encourage participations of our young generation.



Finally, we hope to give a fond memory of the congress with an impressive and famous Thai hospitality and culture in all social events especially in the farewell dinner. In which our guests will enjoy a river cruise on the evening of Loy Kra-thong Day (Thai floating lan-



tern festival) along the sparkling Jaopraya River.

In addition to science, before or after the congress you may explore and enjoy our fascinating varieties of scenery inland and off shore.

Please don't forget to make your bookmark on November 22-25th, 2015 and come to join us.

## 37<sup>th</sup> Congress of the International Union of Physiological Sciences

Birmingham, U.K., from July 21-26, 2013

[www.iups2013.org](http://www.iups2013.org)



# Meeting Calendar 2013



**ANS 2013**  
Australian Neuroscience Society, Inc  
33rd Annual Meeting  
Melbourne Convention Centre and Exhibition Centre  
Melbourne Australia  
Sunday 3 February - Wednesday 6 February

**33<sup>rd</sup> Annual Meeting of the Australian Neuroscience Society**  
Melbourne, Australia, from February 3-6, 2013  
[www.ans2013.org](http://www.ans2013.org)



**27<sup>th</sup> Annual Meeting of Society for Neurochemistry, India**  
New Delhi, India, from February 21-23, 2013  
[www.snci2013.com](http://www.snci2013.com)



**19<sup>th</sup> Asia Pacific Congress of Cardiology**  
Pattaya, Thailand, from February 21-24, 2013  
[www2.kenes.com/apsc2013](http://www2.kenes.com/apsc2013)



**17<sup>th</sup> Pan Arab Conference on Diabetes**  
Cairo, Egypt, from March 26-29, 2013  
[www.arab-diabetes.com](http://www.arab-diabetes.com)



**24<sup>th</sup> Biennial Meeting of the International Society for Neurochemistry (ISN)**  
Cancun, Mexico, from April 20-24, 2013  
<http://www.isn-asncancun2013.org>



**1<sup>st</sup> Seoul International Congress of Endocrinology & Metabolism**  
Seoul, Korea, from May 2-5, 2013  
[www.seoul-endo.org](http://www.seoul-endo.org)



**4<sup>th</sup> International Congress on Neuropathic Pain**  
Toronto, Canada, from May 23-26, 2013  
[www.kenes.com/neuropathic/](http://www.kenes.com/neuropathic/)



**36<sup>th</sup> Annual Meeting of the Japan Neuroscience Society**  
Kyoto, Japan, from June 20-23, 2013  
[www.neuro2013.org](http://www.neuro2013.org)



**21<sup>st</sup> Iranian Congress of Physiology and Pharmacology**  
Tabriz, Iran, from August 23-27, 2013  
[www.congress.tbzmed.ac.ir/page\\_congress\\_en.aspx?](http://www.congress.tbzmed.ac.ir/page_congress_en.aspx?)



**9<sup>th</sup> International Conference on Behaviour, Physiology and Genetics of Wildlife**  
Berlin, Germany, September 18-21, 2013  
[www.wildlife.uni-freiburg.de/events-1/izw2013](http://www.wildlife.uni-freiburg.de/events-1/izw2013)



**XXI World Congress of Neurology**  
Vienna, Austria, September 21-26, 2013  
[www.wcn-neurology.com](http://www.wcn-neurology.com)

## FAOPS e-newsletter



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