Welcome From CPS President Stephen Sims

Welcome to the spring 2012 electronic version of Physiology Canada.

This is my first opportunity to introduce myself to the Physiology community and to describe some of the ongoing initiatives of the Society. As background, I received my PhD in Neuroscience from McMaster University, working with Ed Daniel, followed by postdoctoral training in Physiology at The University of Massachusetts Medical School (Worcester Massachusetts), working on smooth muscle electrophysiology with Josh Singer and John Walsh. This was followed by a year as fellow in David Clapham’s lab in Cardiology at Brigham and Women’s Hospital (Harvard Medical School, Boston). I then joined Physiology at Western in 1987, supported by Medical Research Council Scholarship then Scientist awards. My research examines on ion channels and calcium in smooth muscle and bone cells, most recently focusing on osteoclasts, the cells responsible for the resorption of bone. In addition to maintaining a research program, I presently serve as Associate Vice-Provost in the School of Graduate and Postdoctoral Studies at Western, helping to set policies and administer graduate training programs across the institution.

I am grateful to have the honor to serve as President of CPS and look forward to promoting and strengthening the discipline. In that context, I would like to summarize some of the ongoing initiatives of the Society. We give credit to members of the society for suggesting in an earlier survey that there was a need to hold Physiology meetings in venues and times other than the usual “winter meeting”. It was also felt that there was benefit in holding meetings jointly with other societies or organizations, to enhance participation and create the ‘critical mass’.

Here are several opportunities to meet with like-minded Physiologists in Canada and abroad. We encourage participation and support of CPS meetings. These offer exceptional opportunities for younger trainees to present their findings, with oral presentations in a comfortable setting. In addition to networking with local researchers, the setting is decidedly less daunting than many larger international meetings.

2012:
June 13-15: Canadian Physiological Society, Canadian Society of Pharmacology and Therapeutics and Canadian Society of Pharmaceutical Sciences combined meeting in Toronto.

November 1-4: CPS is cooperating with The Chinese Association of Physiological Sciences (CAPS) to hold the 2012 International Physiology Conference held in Suzhou, PR China. The intent here is to strengthen interactions with physiologists from diverse national societies. CPS has the opportunity to sponsor symposia, and suggestions are welcome from our members.

2013:
July 21-26: XXXVIth International Union of Physiological Sciences meeting in Birmingham, UK.

2014:
August: First Pan-American Congress of Physiological Sciences (PanAm 2014), to be held in Iguassu Falls, Brazil, planned for Aug 2-6 2014. This is a spectacular location and we encourage Physiologists to plan ahead (and save) to attend with trainees. The theme is “Physiology Without Borders”.

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2017:
August: XXXVIIIth International Union of Physiological Sciences meeting in Rio de Janeiro, Brazil.

As a reminder, the Canadian Physiological Society represents your interests. If you have any suggestions on ways to improve communications or introduce new ways of promoting physiology, let us know. Members of the CPS council represent Physiology across the breadth of our country, as detailed below. All are very approachable with suggestions or willingness to participate.

President, Stephen Sims (Department of Physiology and Pharmacology, Western University)
Past President, Douglas Jones (Department of Physiology and Pharmacology, Western University)
Secretary, Melanie Woodin (Department of Cell & Systems Biology, University of Toronto)
Treasurer, Catherine Chan (Department of Physiology and Dept. of Agricultural, Food & Nutritional Sciences, University of Alberta)

Councillors:
Elizabeth Cowley (Department of Physiology & Biophysics, Dalhousie University)
Michael Jonz (Department of Biology, University of Ottawa)
Gerald Zamponi (Professor & Department Head, Physiology & Pharmacology, University of Calgary)
Lingyun Wu (Department of Health Sciences, Lakehead University)
William Cupples (Department of Biomedical Physiology and Kinesiology, Simon Fraser University)
Deda Gillespie (Department of Psychology, Neuroscience and Behaviour, McMaster University)

In closing, I hope you find these Newsletters helpful in promoting Physiology and opportunities for interaction for investigators and trainees. I am thankful to the enthusiastic support of our Secretary, Melanie Woodin, and Treasurer, Cathy Chan, in management of the Society.

Regards,

Stephen Sims
President

Modern Therapeutics

This year the CPS is jointly hosting a meeting with the Canadian Society for Pharmacology and Therapeutics (CSPT) and the Canadian Society for Pharmaceutical Sciences (CSPS), titled “Modern Therapeutics 2012: Advances in Physiology, Pharmacology and Pharmaceutical Sciences”. The meeting will be held from June 12-15th at the University of Toronto. For more details on the meeting please visit our website: http://www.cpsscp.ca/annual-meeting. We look forward to seeing you in June!

Dr. Deda Gillespie is the 2012 J.A.F Stevenson Professor

In addition to visiting the Universities of Toronto and Western Ontario in the Fall, Dr. Gillespie will give a Keynote Lecture at the upcoming CPS meeting titled: “Wired for Sound: establishing excitatory-inhibitory balance in auditory brainstem”

Dr. Deda Gillespie is currently an Assistant Professor in the Department of Psychology, Neuroscience & Behaviour at McMaster University. After receiving a BS (Biology) from Yale University and a PhD (Neuroscience) from UC San Francisco, she went on to postdoctoral work in neurobiology at Northwestern University and the University of Pittsburgh.

Dr. Gillespie’s major research interests lie in sensory processing and neural plasticity, and more specifically in how neural circuits are established and refined during development to optimize neural processing. She has investigated these questions in the mammalian visual and auditory systems, using a variety of physiological techniques—extracellular electrophysiology, in vivo and in vitro whole-cell patch clamp recording, flash photolysis, ion imaging, intrinsic signal optical imaging—and several neuroanatomical approaches.

The Gillespie lab currently studies developmental circuit refinement in the lateral superior olive (LSO), an area of the mammalian auditory brainstem crucial for localizing sound sources and implicated in a number of developmental auditory disorders.
To compute interaural sound intensity differences, neurons in the LSO integrate excitatory inputs from one ear with frequency-matched inhibitory inputs from the other ear; a primary interest of the lab is to understand how these excitatory and inhibitory circuits are coordinately refined in the LSO during neural development. While a postdoc, Dr. Gillespie discovered that a group of inhibitory neurons in the immature auditory brainstem also release the excitatory neurotransmitter glutamate onto LSO neurons. One focus of her lab’s recent work has been to understand how this novel co-release of glutamate with the classical inhibitory neurotransmitters GABA and glycine may support activity-dependent developmental plasticity.

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Dr. Deda Gillespie is the 2012 J.A.F Stevenson Professor

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Dr. Duncan Stewart will Present the 2012 Sarrazin Lecture at “MODERN THERAPEUTICS”

CEO & Scientific Director and Senior Scientist in the Regenerative Medicine Program and Evelyne and Rowell Laishley Chair, Ottawa Hospital Research Institute
Vice President, Research, The Ottawa Hospital
Professor, Department of Medicine, Faculty of Medicine, University of Ottawa

Dr. Duncan Stewart is a pioneering Canadian cardiovascular researcher, who is recognized for his many important discoveries in blood vessel biology as well as his dedication to translating these discoveries into benefits for patients and society. After beginning his career in academic cardiology at McGill University in Montreal, he moved to Toronto as Head of Cardiology at St. Michael’s Hospital and later Director of the Division of Cardiology, and Executive Director of the McLaughlin Centre for Molecular Medicine at the University of Toronto. He was recruited to lead the Ottawa Hospital Research Institute (OHRI) in 2007.

Dr. Stewart has made a number of seminal discoveries elucidating the importance of endothelial factors in health and disease, notably the role of nitric oxide system in angiogenesis and such endothelin-1 in pulmonary hypertension. He is also a leader in developing cell and gene based therapies for cardiovascular disease. He led the first Canadian clinical trial to test an angiogenic gene therapy – using VEGF to try to stimulate heart repair in people who had suffered heart attacks. He is also spearheading the world’s first clinical trial of an gene-enhanced cell therapy for pulmonary hypertension, using endothelial progenitor cells engineered to over-express the endothelial nitric oxide synthase. He is also poised to launch the first enhanced progenitor cell therapy trial for post heart-attack repair, and he is leading a Canadian effort to initiate the world’s first trial of mesenchymal stem cells for the treatment of acute lung injury and acute respiratory distress syndrome. Dr. Stewart has published more than 200 peer-reviewed manuscripts and has received a number of distinctions and prizes, including the Dexter Man Chair of Cardiology and Research Achievement Award of the University of Toronto, and the Research Achievement Award of the Canadian Cardiovascular Society. Throughout his career, Dr. Stewart has demonstrated leadership in bringing diverse groups of clinicians and scientists together to put Canada on the world stage for translational cardiovascular and regenerative medicine research.

Who am I? Where am I?

Nica Borradaile, PhD
Assistant Professor
Department of Physiology & Pharmacology
Schulich School of Medicine & Dentistry
The University of Western Ontario

Nica Borradaile is an Assistant Professor in the Department of Physiology and Pharmacology at the University of Western Ontario, London, Ontario.

After completing undergraduate studies (Pharmacology) at the University of Western Ontario, Nica continued at Western to pursue her MSc (Pharmacology) and PhD (Biochemistry) with her research focus on the effects of plant polyphenols on hepatocyte lipid and lipoprotein metabolism. She was recruited to her present position in 2009 following postdoctoral fellowships at the Washington University School of Medicine (Cardiology), St. Louis, Missouri, and at the Robarts Research Institute (Vascular Biology), London, Ontario.

Dr. Borradaile’s current research interests are in the study of lipid metabolism as it relates to liver and vascular complications of obesity, metabolic syndrome, and type 2 diabetes. In the lab, experiments using cell cultures and mouse models of metabolic disease are aimed at understanding the cellular, molecular, and biochemical mechanisms leading to endothelial and hepatic dysfunction during metabolic...
Who am I? Where am I? Continued...

overload. In particular, projects are underway investigating the roles of elongation factor 1A-1 in apolipoprotein B metabolism, hepatocyte lipotoxicity and the development of nonalcoholic fatty liver disease, and the roles of NAD+ metabolism in endothelial cell lipotoxicity and regenerative angiogenesis during metabolic syndrome. The long-term goal of this work is to identify new targets for the development of pharmaceuticals to manage liver and cardiovascular complications associated with metabolic disease. Research in the Borradaile lab is funded by the Canadian Diabetes Association and the Canadian Institutes of Health Research.

**Physiology Department Updates from Across Canada**

Dr. James Young was recently appointed at Chair of the Department of Physiology at the University of Alberta. To read Dr. Young’s profile please visit:

http://www.physiology.ualberta.ca/Home/People/Academic/young.cfm

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**Recent PhD Theses** The publication of recent trainee thesis or conference abstracts

Functional characterization of urate handling by hSLC2A9 (hGLUT9) splice variants in a heterologous expression system

PhD thesis successfully defended by Kate Witkowska

Laboratory of Dr. Chris Cheeseman

Department of Physiology

University of Alberta

Multiple, independent Genome Wide Association Studies have uncovered a significant correlation between abnormal plasma urate levels and single nucleotide polymorphisms within the hSLC2A9 gene. The gene product was originally characterized as a high affinity D-glucose and D-fructose transporter, which belongs to a larger family of facilitative transmembrane hexose transporters, named GLUTs. The two splice variants, hSLC2A9a and hSLC2a9b, were overexpressed in Xenopus laevis oocytes. A combination of radioisotope flux studies and electrophysiological analysis were employed to functionally characterize the urate-handling of these proteins.

The two human hSLC2A9 (hGLUT9) isoforms mediate high capacity urate transport, which is selectively sensitive to benzbromarone. They display kinetic symmetry in their affinity and capacity to handle extracellular and intracellular urate. Surprisingly, urate uptake mediated by either isoform is not competitively inhibited by extracellular D-glucose and D-fructose over a wide range of concentrations. However, the transporters can exchange hexoses for urate, when the two substrates are placed on opposite sides of the membrane, as evidenced by trans-stimulation. Moreover, the two isoforms display different patterns of urate-transport modulation in response to trans-hexoses and kinase activators, indicating that functional differences between the two isoforms exist.

Given that uric acid is approximately 90% dissociated under physiological pH, and exists as an organic anion (urate) in blood plasma, we investigated hSLC2A9’s capacity to carry current. Indeed, hSLC2A9a- and hSLC2A9b-expressing oocytes produce positive outward current in the presence of extracellular urate. This current does not appear to be sensitive to Na+, and is only moderately affected by Cl- depletion. Hence, we propose that the negatively charged urate is the only species contributing to the electrogenicity of hSLC2A9. Given that the membrane potential is negative inside cells, we propose that both variants act as mediators of urate efflux under physiological conditions.

Both isoforms of hSLC2A9 are expressed in opposite membrane domains of human proximal tubule epithelium. We propose a model for renal handling of urate in humans which explains how hypouricemia and hyperuricemia can be associated with the same gene product, and which may provide new treatment opportunities of gout, hypertension and metabolic syndrome.

Dr. Witkowska is continuing as a Post Doc in Dr. Cheeseman’s lab, but is hoping to move to London, IK to continue her academic career.

http://www.physiology.ualberta.ca/Home/People/Academic/young.cfm
CPS Awards & Funding Opportunities

The CPS Promotional Fund

Up to $2,500.00 will be available twice a year to organizers of CPS events which stimulate physiology research, integration and/or teaching in Canada. For example, the funds can be used as seed money for the holding of a regional meeting, or promotion of the CPS at a national or international conference. There will be two competitions for funds, with application deadlines January 1st and July 1st. Multiple awards may be allocated at any competition. Any funds available from the January competition will be carried forward to the July 1st competition. Regular CPS members are eligible to apply. Send a 1-2 page proposal to the secretary of the CPS, describing the amount requested, date, location and nature of the planned event. Indicate how the requested funds will support the event and how the event will foster Canadian physiology. Events sponsored by the CPS Networking Fund will display a CPS banner to promote the Society and recognize its financial support. For detailed information please visit the CPS website.

Positions Available

Cardiovascular Scientist – Division of BioMedical Sciences, Memorial University of Newfoundland

Department of Biomedical Physiology and Kinesiology
Simon Fraser University
Tenure-track Assistant Professor

The Department of Biomedical Physiology and Kinesiology (http://www.sfu.ca/bpk/) has over 25 faculty members, is committed to excellence in research and teaching, and has outstanding research facilities. Our research encompasses the study of physiology, neuromechanics, and health. Excellent research facilities support collaborative research both within our Department and across the University. The Department currently has faculty with research programs focused on the following chronic diseases: cancer, cardiovascular disease, diabetes and obesity; osteoporosis; neurodegenerative diseases and spinal cord injury. The successful candidate will be expected to have a strong interest in one or more of these or complementary diseases and set up an active, independent, and well-funded research program that integrates well into the department as a whole.

The undergraduate and graduate programs in our Department include core and elective courses in human physiology, anatomy, neuromechanics, and nutrition. The successful candidate will make a commitment to teach these courses and supervise graduate students. Our undergraduate teaching program includes three distinct undergraduate majors: Kinesiology; Biomedical Physiology and Behavioural Neuroscience. We also have well-established graduate programs at the M.Sc. and Ph.D. levels, with particular strengths in Cardiovascular Physiology, Neuromechanics, Chronic Diseases, Environmental Physiology, and Neuroscience.

Our Department is located at the Burnaby Mountain campus of Simon Fraser University in Metro Vancouver. Simon Fraser University is consistently one of the top-ranked universities in Canada. The Vancouver area is renowned as one of the most desirable places to live and work.

The Search Committee will begin considering applications on June 30th 2012 and will continue to accept applications until the position is filled. The anticipated start date is negotiable, but it is expected that the individual will start no later than September 2013. Applications should be sent as a single PDF file inclusive of (and book marked for) the following sections: 1) cover letter; 2) curriculum vitae including teaching experience; 3) one-page statement of research directions and integration within our department; 4) three representative publications; 5) one-page statement of teaching philosophy and 6) names, titles and addresses (including e-mail address) of at least three referees. This PDF file can be sent as an email attachment to: Dr. Glen Tibbits (bpkchair@sfu.ca), Chair, Department of Biomedical Physiology and Kinesiology, Simon Fraser University, Burnaby, BC, V5A 1S6, Canada.

Simon Fraser University is committed to employment equity and welcomes applications from all qualified men and women. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. All appointments are subject to funding. Please note that under the University Act personal information that is required by the University for academic appointment competitions will be collected. For further details see the Collection Notice at http://www.sfu.ca/vpacademic/faculty_openings/collection_notice.html
Upcoming Physiology Meetings

Physiology 2012 (Main meeting of the Physiological Society)
July 3-5, 2012
Edinburgh, UK
http://www.physiology2012.org

Autonomic Regulation of Cardiovascular Function in Health and Disease
July 7-10, 2012
Omaha, Nebraska
http://www.the-aps.org/mm/Conferences/APS-Conferences/2012-Conferences/Autonomic-Regulation-of-Cardiovascular-Function-in-Health-and-Disease

Integrative Biology of Exercise
October 10-13, 2012
Westminster, Colorado
http://www.the-aps.org/mm/Conferences/APS-Conferences/2012-Conferences/Integrative-Biology-of-Exercise

7th European Elastin Meeting
September 1-4, 2012
Ghent, Belgium
http://www.elastin2012.be

IUPS 2013 37th Congress of the International Union of the Physiological Sciences
July 21-26, 2013
Birmingham, UK
http://www.iups.org/

Submissions & Contact Information

We welcome your contributions! If you would like to be featured in “Who am I? Where am I?” or write a historical perspective, send us a note.

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