

**AMERICAN PHYSIOLOGICAL SOCIETY**

**CELL & MOLECULAR SECTION NEWSLETTER**

**SPRING 2004**

**MESSAGE FROM THE CHAIR**

NIH Roadmap: Opportunities for Cell and Molecular Physiology

As we are all aware, several new future areas of research emphasis have been described in the NIH Roadmap ([nihroadmap.nih.gov](http://nihroadmap.nih.gov)). Some of these are in the form of initiatives that are collectively referred to as New Pathways to Discovery. These initiatives are organized into 5 groups: 1) Building Blocks, Biological Pathways, and Networks; 2) Molecular Libraries and Imaging; 3) Structural Biology; 4) Bioinformatics and Computational Biology; and 5) Nanomedicine. These sets of interrelated initiatives are all very important for cell physiologists, and I hope the membership of our Section takes the time to read the descriptions of each of them.

Many members of the Cell and Molecular Section should be especially excited by the Building Blocks, Biological Pathways, and Networks initiative. The introductory overview of this set of initiatives in the NIH Roadmap is presented in the context of the “proteome” and “metabolome”. We have heard these are terms a lot in the last few years, but they are still sufficiently new that the NIH web page puts them in quotation marks. The text of the overview says the following about the proteome and metabolome. “To better understand the proteome, innovative tools must be developed that will enable researchers to determine in real time the amounts, locations, and interactions of large numbers of individual proteins within a single cell.” The next paragraph points out that “researchers are eager for technologies that will enable them to measure local concentrations of carbohydrates, lipids, amino acids, and other metabolites within a single cell or even a specific part of a single cell.” In my view these statements describe two of the central goals of cellular and molecular physiology.

The above two passages from the Roadmap represent exciting possibilities for the future of cell physiology. Many of us try our best to quantify the levels of one or, at best, a few metabolites (including inorganic ions and pH), second messengers, and/or proteins under a given set of circumstances in a particular compartment of a living cell. The ability to measure many such parameters in a single cell in real time would transform our discipline and enable us to ask entirely new questions, and answer old questions, about cellular function. The technologies needed to do this, especially at the level of a single cell, will take years to develop and refine, but now is the time to embrace the opportunity offered by these NIH initiatives and to begin thinking not only about how such technologies might best be developed but also about potential applications.

In order to use these developing technologies to full advantage, it will be necessary to determine how to combine a basic physiological question with a choice of experimental cellular system, analytical technique, and conceptual/ computational framework for analysis of the data. It is unlikely that any individual can do this by him/herself. Accordingly, it is not surprising that another of the major initiatives in the Roadmap is to stimulate interdisciplinary research teams. The example given in the Roadmap overview is that "behavioral scientists, molecular biologists, and mathematicians might combine their research tools, approaches, and technologies to more powerfully solve the puzzles of complex health problems such as pain and obesity." Such a team would indeed be formidable, but I would submit that, for a vast majority of interdisciplinary teams, it will be critical to include people who are experts in the quantitative study of the functions of intact cells, i.e., cell physiologists. Cell physiologists are in a good position to speak the language not only of molecular biology and biochemistry but also of integrative organ system physiology. For this reason, I encourage all of our membership to consider becoming not only members but also leaders of interdisciplinary research teams. This does not mean we have to give up or even de-emphasize our individual research programs, but the emerging importance of interdisciplinary teams represents an opportunity that cell physiologists should use to our advantage.

This is my last year as Chair of the Cell and Molecular Section, and I want to thank all the membership for your support of our Section's activities over the past three years. I am grateful to all the members of the Steering Committee, and, especially, to the two Vice Chairs, Martha O'Donnell, and Carole Liedtke, who have held that position during my time as Chair. I am also indebted to Bob Gunn, my long-time friend who has genuinely lived up to the title of Sage. I will now move into that position, with big shoes to fill.

Mike Jennings  
Chair, APS Cell and Molecular Section

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## ELECTION AWARDS

The Fall, 2003 election results have been tallied. The results of the election are:

Chair: Carole M. Liedtke  
Councilor: Ann Pajor (2 year term)  
Scott O'Grady (3 year term as Committee on Committees Section Representative).

Congratulations to the new Steering Committee members and new Chair. For members of the Section, these are great contacts for your ideas and suggestions for future section events and program as well as feedback on past activities. You can call, write, phone, or fax each at the contact numbers on the Steering Committee Roster appended to this newsletter. Best of luck in the future to each of you.

This election also led to a vacancy in the position of Vice-Chair. A special election for the remainder of the term is now in progress. Two willing candidates for the position are Thomas Pressley and Eric Delpire. Please remember to vote !

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## SECTION AWARDS

### TRAINEE AWARDS

The Steering Committee is proud to announce the winners of our annual awards competition for Young Investigator and predoctoral trainees. Young Investigator awardees are Keri Kles (Univ. Chicago, mentor Eugene Chang) and Christie Cefaratti (Case Western Reserve Univ., mentor Antonio Scarpa). Predoctoral Awardees are Suzanne D. McAlear (Univ. Alabama at Birmingham, mentor Mark O. Bevenssee) and Narendranath R. Chintagari (Oklahoma State Univ, mentor Lin Liu).

The Steering Committee also awarded the section's Proctor and Gamble Professional Opportunity Award to Alice C. Carpenter (Louisiana State Univ. Health Science Center, (mentor, J. Steven Alexander). The Proctor and Gamble Award is awarded to predoctoral students within 18 months of obtaining their degree.

We congratulate all our award winners and encourage section members to visit their posters at EB2004. The awards will be presented to the winners at our Banquet so be sure to come and congratulate them!

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### CAMPS BANQUET AT EB2004

The Cell and Molecular Physiology Section will hold its EB2004 banquet on Monday, April 19<sup>th</sup> at Tony Cheng Seafood Restaurant, 619 H Street, Washington, D.C. The restaurant is within walking distance from the convention center.

A cocktail hour at 6:30 pm will start the evening off. Dinner will follow at 7:30 pm. The banquet speaker is **Dale Benos, Ph.D.**, University of Alabama at Birmingham. The banquet offers a great opportunity for mentor and mentees to network as well as socialize with your colleagues. Please encourage your graduate students and postdoctoral fellows and junior faculty to come and join us. The cost for the dinner is \$45 for Section members and only \$22.50 for students and postdoctoral fellows of Section members.

**IMPORTANT:** All tickets must be purchased BEFORE the meeting. For tickets, send a completed ticket request form with a self-addressed stamped envelope and check (payable to **APS:Cell and Molecular Physiology Section**) to Dr. Carole M. Liedtke, Department of Pediatrics, 2109 Adelbert Rd., BRB Rm 824, Cleveland, OH 44106-4948. Ticket request forms are attached with this newsletter.

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### HUGH DAVSON DISTINGUISHED LECTURER

The Cell and Molecular Physiology Section will sponsor **Peter Agre, M.D.**, as the Hugh Davson Distinguished Lecturer at EB2004 in Washington, D.C. on Monday, April 19 at 8:00 am at the Washington Convention Center, Ballroom B. Dr. Peter Agre is Professor of Biological Chemistry at the Johns Hopkins University. Peter earned a bachelor's degree in chemistry from Augsburg College, Northfield, Minn., and received a medical doctorate from Johns Hopkins in 1974. In 1981, after post-graduate medical training and then a fellowship at the University of North Carolina at Chapel Hill, Peter returned to Johns Hopkins, where he progresses through the

ranks of the departments of medicine and cell biology and, in 1993, was recruited to the Department of Biological Chemistry. In 1991, his laboratory discovered a long-sought "channel" that regulates and facilitates water molecule transport through cell membranes, a process essential to all living organisms. This discovery, dubbed "water pore" or aquaporin, ushered in an enlightened age of biochemical, physiological and genetic studies of these proteins in bacteria, plants and mammals, and fundamental understanding -- at the molecular level -- of malfunctioning channels associated with many diseases of the kidneys, skeletal muscle and other organs. Working from this basic knowledge, scientists are searching for drugs that can specifically target water channel defects. Peter was elected to membership in the National Academy of Sciences in 2000 and to the American Academy of Arts and Sciences in 2003. Peter was awarded the 2003 Nobel Prize in Chemistry by the Royal Swedish Academy of sciences in recognition of his discovery water channels.

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## EXPERIMENTAL BIOLOGY 2004

Once again, the Cell and Molecular Physiology Section program co-chairs, working with other sections, have planned an outstanding program at the EB 2004 meeting. Presented below is a synopsis of the program sponsored or cosponsored by Cell and Molecular Physiology Section as well as other sessions of interest.

### SESSIONS SPONSORED BY THE CELL AND MOLECULAR SECTION

#### HUGH DAVSON DISTINGUISHED LECTURE

Peter Agre, Monday, April 19, 8:00-9:00 am, Ballroom B

#### Symposia:

**The Role of Integrins in Vascular Cell Signaling and Regulation of Vascular Tone and Permeability**, Tuesday, April 20, 8:00-10:00 a.m., Rm. 146A, Organizer: M.J. Davis  
**Mitochondrial Function in Aging and Disease**, Wednesday, April 21, 8:00-10:00 am, Rm. 146B, Organizer: K.E. Conley.

**Cross-sectional Symposia Supported by Cell and Molecular Physiology Section:**  
**Intracellular Trafficking of Membrane Proteins in Renal Epithelia**, Sunday, April 18, 3:15-5:15 pm, Rm. 145C, Organizers: P.A. Welling and M. Caplan  
**Biological Applications of Nanotechnology**, Monday, April 19, 10:30 am-12 noon, Rm. 146B, Organizer: J. Bhattacharya  
**The Mechanisms and Impact of Fetal Physiological Programming**, Tuesday, April 20, 8-10 am, Rm. 146B, Organizer: J. Schwartz

#### Section Sponsored Feature Topics:

**Rho and Rho Associate Kinase Pathways**, Sunday, April 18, 8:00-10:00 am, Rm. 146C, Organizer: R.J. Paul  
**Capacitative Calcium Entry**, Sunday, April 18, 10:30 am-12:30 pm, Rm. 145B, Organizers: P. Bounelis and R.B. Marchase  
**Vacuolar Type H<sup>+</sup> - ATPases: Structure and Cellular Function in Mammalian Cells**, Tuesday, April 20, 8:00-10:00 am, Rm. 147B, Organizer: R. Martinez-Zaguilan

**OTHER SESSIONS OF INTEREST TO CELL SECTION MEMBERS:**

**Physiology in Focus:** Large Scale Systems Biology

**Symposia and Featured Topics:**

**Saturday, April 17, 12-3 pm**

Microarrays, Proteomics and Mass Spectrometry, Rm. 146C, S. Olds

**Sunday, April 18, 10:30 am – 12 noon**

Regulation of Intestinal Ion and Vitamin Transporters During Development, Mrinalini C. Rao

**Sunday, April 18, 3:15-5:15 pm**

Molecular Physiology of Oxygen Homeostasis: Oxygen-Dependent Hydroxylation, Rm. 140B, S. Lahiri

Spectrum of Ion Channels in Alveolar Epithelial Cells: Implications in Alveolar Fluid Balance and Cell Volume Regulation, Rm. 145B, K.J. Kim and Kemp

**Monday, April 19, 8-10 am**

Stem Cells and Progenitors Cells: Biology, Physiology, and Therapeutic Applications, Rm. 146C, K. March

Comparative Regulation of Renal and Intestinal Phosphorus Processing and Transport: From Molecules to Environment, Rm. 140C, A. Werner and S.H. Sugiura

**Monday, April 19, 10:30 am-12 noon**

The TRP Superfamily of Cation Channels: Emerging Roles in Epithelial Physiology, Rm. 147B, P.R. Smith

**Monday, April 19, 3:15-5:15 pm**

Membrane Traffic in Epithelial Cells, Rm. 140A, Kevin L. Kirk

**Tuesday, April 20, 8-10 am**

Epithelial Na and K Channels, Rm. 140B, S.M. O'Grady and J. Stoddard

**Tuesday, April 20, 10:30 am-12 noon**

Stem Cells of the Developing and Adult Lung, Rm. 146C, C.M. St. Croix and B.R. Stripp

Store-Operated Calcium Channels and Control of Muscle Contraction, RM. 145B, J. Ma

**Tuesday, April 20, 3:15-5:15 pm**

New Genomic Technologies for Systems Biology, Rm. 146B, A. Kwitek

**Wednesday, April 21, 8-10 am**

Claudin Expression and Function in the Kidney, Rm. 145A, R.C. Harris

**Wednesday, April 21, 8-10 am**

Metalloprotenase and Diabetes, Rm, 145A, S.C. Tyagi

Cell-Cell Contacts in Regulating Lung Function, Rm. 145B, M. Koval

Stem Cells: The State of the Progenitor, RM. 146C, M. Hawkins

## **Workshops and Special Symposia:**

APS Committees and Sections provide excellent opportunities for young physiologists to acquire new skills for their future career in science and for section members who want to sharpen their skills. EB2004 offers these special programs:

- Cellular Homeostasis, Refresher Course, Saturday, April 17, 8 am to 12 noon and Sunday, April 18m 10:30-11:30 am, Rm. 146C, Education Committee
- Making Science News, A Journalists Roundtable, Saturday, April 18, 2-5 pm, Rm. 140A, Communication Committee
- Collaboration: The cornerstone of science, learning and change, Sunday, April 18, 10:20 am-12 noon, Rm. 140A, Teaching Section
- Bioinformatics How-to for the Wet-Lab Physiologists, Sunday, April 18, 3:15-5:15 pm, Rm 146C, Organizer H. Jacob
- Peer Review, Ethics and New Features of APS Journals, Monday, April 19, 10:30 am-12 noon, Rm. 140A, Publications Committee
- Planning a Successful Postdoctoral Experience, Monday, April 19, 3:15-5:15 pm, Rm. 145A, Careers Committee
- High content Biology: Multiplexing in Cell Physiology, Monday, April 19, 3:15-5:15 pm, Rm. 146A, Liasion With Industry Committee
- Life After the Ph.D.: Finding a Postdoctoral Fellowship, Tuesday, April 20, 8-10 am, Rm. 145A, Women in Physiology Committee and ASPET Women in Pharmacology Committee

Section Program Co-chairs

Ron Lynch [rlynch@u.arizona.edu](mailto:rlynch@u.arizona.edu)

John Payne [japayne@ucdavis.edu](mailto:japayne@ucdavis.edu)

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### **MESSAGE FROM THE EDITOR OF AJP CELL PHYSIOLOGY**

In my Fall 2003 message, I mentioned that I was very happy with the increased number of submissions from Cell section members. However, nothing prepared me and my excellent team of Associate Editors for the veritable flood of new submissions that we have received so far this year. As I write this message shortly after Valentine's Day 2004, our submissions are up a staggering 55% compared to the same time last year. Thank you to everyone for your considerable efforts in supporting our Journal. A survey of the submissions shows that they cover all topics that fall under the cell physiology umbrella. However, the common theme - mechanisms of cell signaling - is growing stronger, and new submissions in this area are especially important to our mandate.

I would like to stress again that a major strength of the Journal is the superb team of Associate Editors who work tirelessly to make everything happen in a timely manner. For those of you who are still not familiar with the Associate Editors and their areas of expertise, here is more information that was taken from their profiles on the APS Central website. If you are uncertain as to the suitability of any manuscript for AJP Cell Physiology, feel free to contact any of us with your questions:

Seth Alper (Beth Israel Deaconess Medical Center, Boston)

salper@caregroup.harvard.edu

Kidney, digestive tract, epithelial cells, acidosis, acid-base, ammonium, anions, anion channels, anion exchange, chloride, bicarbonate, calcium signaling, cell volume, brain, fluid transport, heparan sulfate, glycosaminoglycan, polysaccharide(s), vascular biology, endothelial cell, smooth muscle cell, angiogenesis, atherosclerosis, transgenic animals, gene expression, regulation, antisense techniques, hematology, hemoglobinopathy, leukemia, blood coagulation, anticoagulant mechanisms, thrombosis, pumps, carriers, channels, pH and volume regulation, ion transport, kidney physiology, renal function

Dennis Brown (Massachusetts General Hospital, Boston)

[ajpcell@rcn.com](mailto:ajpcell@rcn.com)

Exocytosis, endocytosis, immunofluorescence, water channels, aquaporins, cell polarity, protein trafficking, Golgi trafficking, proton pumps, V-ATPases, vesicle transport, microtubules, cytoskeleton

William T. Gerthoffer (University of Nevada School of Medicine, Reno)

wtg@med.unr.edu

Muscle mechanics, contractile proteins, cytoskeletal proteins, protein kinases, protein phosphorylation, MAP kinases, signal transduction, HSP27, cell motility, vascular physiology, smooth muscle contractile protein, smooth muscle cell biology, myosin, caldesmon, calponin, cytokines, inflammation, RNA stability, gene expression

Kathy K. Griendling (Emory University School of Medicine, Atlanta)

kgriend@emory.edu

Atherosclerosis, cardiovascular diseases, gene regulation, hypertension, receptors, NADPH oxidases, angiotensin II, vascular biology, AT1 receptors, oxidases, vascular smooth muscle, oxidative stress, restenosis, hypertrophy

Paul A. Insel (University of California, San Diego)

inseloffice@ucsd.edu; pinsel@ucsd.edu

Cardiac myocytes, adenylyl cyclases, cyclic AMP, receptor metabolism & regulation, receptors linked to G-proteins

Jennifer L. Stow (University of Brisbane, Australia)

j.stow@cmcb.uq.edu.au

Membrane trafficking, cell polarity, vesicle budding and fusion, secretory pathway, trafficking in epithelial cells, trafficking in macrophages, E-cadherin, cell-cell contact, Golgi complex

Kevin Strange (Vanderbilt University Medical Center, Nashville)

kevin.strange@mcm.vanderbilt.edu

*C. elegans*, Ca<sup>2+</sup> signaling, cell volume, electrophysiology, functional genomics, ion channels, mechanosensitive ion channels, model organisms, organic osmolytes, osmoregulation, osmotic stress, patch clamp, quantitative microscopy, transporters, video microscopy

Kathy Sweadner (Massachusetts General Hospital, Boston)

sweadner@helix.mgh.harvard.edu

Biochemistry, molecular biology, cell biology and function of the Na/K-ATPase and associated regulatory proteins, FXYD proteins as regulators of the Na/K-ATPase in the kidney, Na/K-ATPase isoform expression and function, ion transport processes in epithelial cells and nervous tissue, nitric oxide regulation of the Na/K-ATPase

In addition to these Associate Editors, we are always looking to expand the expertise of our editorial board by adding new members, and replacing those whose service is coming to an end (about 3 years on average). One area in which we are somewhat deficient at the moment is in the category of cell growth, differentiation and apoptosis. If you would like to be considered as a Board member, or would like to propose a colleague for this elite and prestigious position, please contact me directly with your suggestions.

In the meantime, keep the manuscripts rolling in. As usual I am always open to suggestions for timely review articles and I remind you once again to turn those NIH grant background sections into AJP Cell Physiology reviews.

Thank you all for your continued and apparently increasing support of the journal - the snowball effect is ongoing - the more momentum we gather the larger and more influential we will become.

Best regards to all Cell section members

Dennis Brown  
Editor, AJP Cell Physiology

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### **APS and CELL SECTION TRAINEE REPRESENTATION**

**Survey Results:** Thank you to those who responded to the Cell and Molecular Physiology Section Task Force on Trainees' survey! According to the responses, our primary concerns are acquiring information on granting and job/career choices. Balancing career and family and obtaining appropriate mentoring were also high-ranking concerns. For the most part, PI's ranked their concerns similarly to trainees with some exceptions being awards and teaching, which were more important to trainees. The APS Trainee Advisory Committee is now using our results to guide revision of the survey for Society-wide distribution. New and old survey results will help prioritize goals for the Committee within the framework outlined on the Committee's web page (linked to the APS homepage under "Committees").

**Let's get together:** There are several things going on before and during EB2004 of interest to those concerned with trainee issues. At EB there is a session "Planning a Successful Postdoctoral Experience: A Proactive Approach" sponsored by the APS Careers Committee. Immediately preceding and/or concurrent with EB there are two meetings in DC: "Convocation on Enhancing the Postdoctoral Experience" (<http://www7.nationalacademies.org/postdoc/>) and the annual meeting of the National Postdoctoral Association ([http://www.nationalpostdoc.org/annual\\_meeting/](http://www.nationalpostdoc.org/annual_meeting/)).

**Opportunity to get involved:** We are in need of a new Trainee Representative. As I have accepted the position of Chair of the APS Trainee Advisory Committee, I must resign as the Cell and Molecular Physiology Section Trainee Representative. I strongly encourage everyone eligible (graduate students up to but not including Assistant Professors) to apply. This is a tremendous opportunity. Serving on the Section Steering Committee has definitely been a highlight of my young career. I have gained invaluable insight into the inner workings of APS and biomedical research in general. Additionally, I have had the opportunity to work with and get to know some of the brightest and nicest people I ever hope to meet. If you are interested in serving please contact Mike Jennings or Carole Liedtke (Section Chair or Vice Chair). I am happy to answer any questions about the position. Send me an email and I will get back in touch ([caroline.sussman@case.edu](mailto:caroline.sussman@case.edu)).

Finally, since this is my last contribution to the Section newsletter as the Trainee Representative, I just want to thank the Section for providing me with the opportunity to serve. It sounds hokey but it really has been an honor and a privilege.

Caroline Sussman  
CAMPS Steering Committee Postdoctoral Representative  
Chair of the CAMPS Task Force on Trainees

### **APS LIAISON WITH INDUSTRY COMMITTEE EB2004 WORKSHOP**

The LWIC is sponsoring a workshop entitled "High content Biology: Multiplexing in Cell Physiology at EB2004 on Monday, April 19<sup>th</sup> from 3:15 pm to 5:15 pm. Topic for discussion are cell signaling, protein translocation, protein phosphorylation cascade, GPCR signaling and genomic mutational analysis. The LWIC is sponsoring a Novel Disease Model Award to be granted to a graduate student and a postdoctoral fellow who submit the best abstracts at EB2004 that describe a novel disease mode. The model can be in vitro or in vivo but should clearly emphasize the potential utility of the system for future research related to a disease. The award is \$500 for the graduate student and \$800 for the postdoctoral fellow.

You're invited! Come meet and dine with your fellow physiologists who are working in the corporate. The 4<sup>th</sup> Annual Liaison With Industry Committee Mixer will take place at EB2004. Look for details in the EB2004 Program.

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### **"MAKING SCIENCE NEWS" SYMPOSIUM AT EB 2004**

For the second year in a row, the APS Communications Committee will host the "Making Science News" symposium at EB 2004. This symposium will address how research is translated into news and the best ways to communicate with journalists. "Making Science News" will feature a panel of speakers from three major forms of mass media. Following the panel discussion, APS publicist Donna Krupa will lead a workshop about translating one's research to a media-ready format and will detail how the Society has garnered media placements on CNN, in WebMD, Science and the BBC. Those interested in the workshop portion of the symposium are asked to register. For more information and workshop registration form, go to <http://www.the-aps.org/press/conference/eb04/sciencenews.htm>.

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### **35<sup>th</sup> INTERNATIONAL CONGRESS OF PHYSIOLOGICAL SCIENCES**

The United States will host the 35<sup>th</sup> International Congress of Physiological Sciences in April, 2005 in San Diego. The 2005 Congress is being organized by the US National Committee of the IUPS, comprised of the American Physiological Society, Society for Neuroscience, Biomedical Engineering Society, Microcirculatory Society, Society of General Physiologists, and the Society for Integrative and Comparative Biology. The theme of the Congress is "From Genomes to Function." The organizing committee is organizing and raising corporate and member donations for the meeting. If section members have corporate contacts for companies that might be interested in supporting specific seminars, colloquia, satellite, travel fellowships or the meeting in general, please contact Bob Gunn ([rbgunn@emory.edu](mailto:rbgunn@emory.edu)), Section member and member of the National Organizing Committee.

