

# EPITHELIAL TRANSPORT GROUP NEWSLETTER

Fall, 2003

## MESSAGE FROM THE CHAIR

In this, my first letter as Chair, I would like to thank Tom Kleyman for his sterling service on behalf of the ETG over the last two years. I only hope that I can adequately fill his place during my tenure and keep building on the work he has done so far. Fortunately, Tom is still a member of the Steering Committee in the capacity of Past Chair ("Sage"), and so I hope I will be able to continue to draw on his experience. Matthias Hediger will be working with me as Vice Chair during my term and is currently editor of the newsletter. We will both serve as members of the Joint Programming Committee in the coming year. I would also like to take this opportunity to welcome four new members of the Steering Committee who were elected this Fall: Neil Bradbury of the University of Pittsburg, Douglas Eaton of Emory University, Moshe Levi of the University of Colorado and Michael Romero of Case Western Reserve University. We had a record number (over 30) of individuals who offered to stand for election this year, of whom seven went forward for the final ballot. They will formally assume their duties at EB04 in Washington D.C. next spring. I would also like to mention Klaus Beyenbach, who will rotate off the committee at EB04, who has done a wonderful job in re-drafting the ETG by-laws. These will soon be finalized and ready to be viewed on the ETG Website.

In reference to EB04, I would like to draw your attention to the symposium and featured topics sessions that the ETG will be sponsoring at the meeting. Peter Smith has put together an outstanding symposium on "The TRP Superfamily of Cation Channels: Emerging Roles in Epithelial Physiology". The speakers in this session are leaders in the Trp channel field: Craig Montell, Michael Zhu, David Cohen and our own Matthias Hediger. This promises to be an exciting session on an important channel family. Our Featured Topics sessions are "Epithelial Na<sup>+</sup> and K<sup>+</sup> Channels" organized by Scott O'Grady and Jim Stockand and "Membrane Traffic in Epithelial Cells" organized by Kevin Kirk. Each of these sessions will have a featured speaker, Larry Palmer and Keith Mostov, respectively. I would like to remind you that the Featured Topics sessions are primarily abstract driven and so provide a forum for graduate students and fellows to present their work. I would also like to draw your attention to the ETG sponsored awards for trainees (graduate students, post-doctoral fellows, medical students, residents, fellows) who are presenting their work at EB04. Details of these

awards can be found later in the newsletter and I encourage you to encourage your trainees to submit their abstracts for consideration by the Steering Committee.

If any of you have any concerns or ideas that you think might improve the ETG, please feel free to contact me at [fuller@physiology.uab.edu](mailto:fuller@physiology.uab.edu). or Matthias at [mhediger@rics.bwh.harvard.edu](mailto:mhediger@rics.bwh.harvard.edu). In the meantime, I wish you all a Happy Holiday and look forward to seeing you in Washington.

Yours,

Cathy Fuller

## EXPERIMENTAL BIOLOGY 2004

### CALL FOR ABSTRACTS FOR EXPERIMENTAL BIOLOGY 2004

If you are interested in submitting an abstract for the 2004 Experimental Biology meeting please see the EB 2004 website at:

<http://www.faseb.org/meetings/eb2004/>

The deadline for submission is Wednesday, November 12, 2003.

#### **The featured topics for the epithelial transport group are as follows:**

- 1098-APS Active transport, cotransporters, and exchangers in epithelia
- 1099-APS Epithelial cell polarity and membrane traffic
- 1100-APS Epithelial Cl<sup>-</sup> channels
- 1101-APS Epithelial genomics and proteomics
- 1102-APS Epithelial Na<sup>+</sup> and K<sup>+</sup> channels
- 1103-APS Epithelial transport of organic solutes and drugs
- 1104-APS Model systems including transgenic animals
- 1105-APS Molecular biology, physiology and pathophysiology of epithelial transporters and pumps
- 1106-APS Multivalent ion transport including trp and PKD channels
- 1107-APS Protein-protein and protein-lipid interactions in epithelial transport
- 1108-APS Regulation of epithelial cell volume
- 1109-APS Second messengers and signaling in epithelial transport
- 1110-APS Tight junctions and gap junctions in epithelia: structure and regulation
- 1111-APS Transporters involved in epithelial acid/base homeostasis
- 1112-APS Water channels: structure, function, and regulation

Based on the quality and quantity of submissions, selected abstracts may be programmed into an oral featured topic session. Abstracts programmed into oral sessions will be presented twice: as a poster and in the oral session.

## **ETG STUDENT AND YOUNG INVESTIGATOR AWARDS**

The Epithelial Transport Group Student and Young Investigator Awards (\$250) will be given to one pre-doctoral and one post-doctoral candidate for outstanding research in a topic related to epithelial physiology. To be eligible for the award, the candidate must be the first author on an abstract submitted under one of the headings outlined under the Epithelial Transport Group topic categories (1098-APS through 1112-APS) at the Experimental Biology meeting, and for the post-doctoral award, must hold either a Ph.D., M.D., D.V.M., or other comparable higher degree. Applicants should submit a copy of their abstract, a completed APS Award Certification Form and a one-page CV to Cathy Fuller Ph.D., Dept. of Physiology and Biophysics, University of Alabama at Birmingham, Birmingham AL 35294-0005 ([fuller@physiology.uab.edu](mailto:fuller@physiology.uab.edu)) for review by the ETG Steering Committee. Deadline for application is December 12, 2003.

## **Sessions of Interest to ETG Members at EB04**

As all members of ETG realize, many different aspects of physiology involve epithelia and sessions of potential interest to ETG members are scheduled by the different APS sections, including Cell and Molecular, Renal, Gastrointestinal, Respiration, Water and Electrolyte and Comparative Physiology. Below is a comprehensive list of symposia and featured topics of broad epithelial interest:

### **Epithelial Transport Group:**

#### **Symposium:**

**The TRP Superfamily of Cation Channels: Emerging Roles in Epithelial Physiology.** Organizer: Peter Smith, Ph.D. Dept. of Physiology and Biophysics, University of Alabama at Birmingham. Monday, April 19, 2004, 10:30 AM-12:30 PM

#### **Speakers:**

Craig Montell, Ph.D., Johns Hopkins School of Medicine, "Overview of the TRP superfamily"

Michael Zhu, Ph.D. Ohio State University, "TRPCs and their associated proteins"

David Cohen, M.D. Oregon Health and Science University, "The tonicity gated channel TRPV4 and its regulation by src family kinase"

Matthias A. Hediger, Ph.D. Harvard Medical School, "Epithelial calcium channels (TRPV5 and TRPV6)".

#### **Featured Topics:**

**Membrane Traffic in Epithelial Cells.** Organizer: Kevin Kirk, Ph.D., University of Alabama at Birmingham. Speaker: Keith Mostov, M.D. Ph.D., University of California, San Francisco. Monday, April 19, 2004, 3:15 – 5:15 PM.

**Epithelial Na<sup>+</sup> and K<sup>+</sup> Channels.** Organizers: Scott O'Grady Ph.D., University of Minnesota, and Jim Stockand, Ph.D., University of Texas Health Sciences Center, San Antonio. Speaker: Larry Palmer, Ph.D., Cornell University. Tuesday, April 20, 2004, 8:00-10:00 AM.

**Special Symposia:**

Guyton Memorial: Arthur C. Guyton: The Man and His Science. Joey Granger. Tuesday, April 20, 2004. 3:15-5:15 PM.

Cross-Sectional Symposium: Intracellular Trafficking of Membrane Proteins in Renal Epithelia, Paul Welling and Michael Caplan, Sunday, April 18, 2004, 3:15-5:15 PM

Workshop: The Promised Land or Fatal Attraction? A Practical Overview of the Present and Future of Genetically Engineered Mice. Donald E. Kohan, Saturday, April 17, 2004, 3:15-5:15 PM.

**Cell and Molecular Physiology Section:**

Hugh Davson Distinguished Lectureship: Peter Agre, Johns Hopkins School of Medicine, "Aquaporin Water Channels at the Convergence of Physiology and Medicine". Monday, April 19, 2004, 8:00-9:00 AM

**Featured Topics:**

Capacitative Ca<sup>2+</sup> Entry. Pam Bounelis and Richard Marchase, Sunday, April 18, 2004, 10:30 AM -12:30 PM.

Vacuolar-type H<sup>+</sup>-ATPases: Structure and Cellular Function in Mammalian Cells. Raul Martinez-Zaguilan, Tuesday, April 20, 2004, 8:00-10:00 AM

**Comparative Physiology Section:**

August Krogh Distinguished Lectureship: William Dantzler, University of Arizona. "A Vertebrate Renal Odyssey – Organic Solute Excretion and Water Conservation in Reptiles, Birds and Mammals" Monday, April 19, 2004, 2:00-3:00 PM.

**Featured Topics:**

Insect Models of Epithelial Tissue Transport. Karl Karnaky, Tuesday, April 20, 2004, 3:15-5:15 PM

Comparative Regulation of Renal and Intestinal Protein Processing and Transport: From Molecules to Environment. Andreas Werner, Monday, April 19, 2004, 8:00-10:00 AM.

## **Gastrointestinal and Liver Section:**

Horace W. Davenport Distinguished Lectureship: John Forte, University of California, Berkeley. "The Gastric Hydrogen Ion Cycle". Monday, April 19, 2004, 3:15-4:15 PM.

### **Featured Topics:**

Regulation of Intestinal Ion and Vitamin Transporters During Development. Mrinalini Rao, Sunday, April 18, 2004 10:30 AM-12:30 PM.

## **Renal Section:**

Carl W. Gottschalk Distinguished Lectureship: Thomas Jentsch, University of Hamburg. "Chloride Transport in the Kidney: Insights from Mouse Models and Human Disease". Sunday, April 18, 2004, 8:00-9:00 AM.

### **Symposia:**

Polycystic Kidney Disease: From Bench to Bedside. Arlene B. Chapman, Monday, April 19, 2004, 8:00-10:00 AM.

Claudin Expression and Function in the Kidney; Raymond C. Harris, Wednesday, April 21, 2004, 8:00-10:00 AM.

## **Respiration Section:**

### **Symposium:**

Integrated Control of Lung Fluid Balance, Dolly Mehta and Asrar B. Malik, Monday, April 19, 2004, 8:00-10:00 AM

### **Featured Topics:**

Spectrum of Ion Channels in Alveolar Epithelial Cells: Implications in Alveolar Fluid Balance and Cell Volume Regulation. Kwang-Jin Kim, Sunday, April 18, 2004, 3:15-5:15 PM.

Cell-Cell Contacts in Regulating Lung Function. Michael Koval, Wednesday, April 21, 2004, 10:30 AM -12:30 PM.

## **Water and Electrolyte Section:**

Ernest H. Starling Distinguished Lectureship. Christopher Wilcox, Georgetown University. "Oxidative Stress and Functional NO Deficiency in the Kidney: A Critical Link to Hypertension" Tuesday, April 20, 2004, 2:00-3:00 PM.

## **Physiological Genomics Group:**

A Bioinformatics How-to for the Wet-Lab Physiologist. Howard Jacob, Sunday, April 18, 2004, 3:15-5:15 PM.

## **INTERNATIONAL UNION OF PHYSIOLOGICAL SCIENCES 2005 and EXPERIMENTAL BIOLOGY 2005**

### **35<sup>TH</sup> CONGRESS OF THE INTERNATIONAL UNION OF PHYSIOLOGICAL SCIENCES (IUPS) 2005: FROM GENOMES TO FUNCTIONS, MARCH 31-APRIL 5, 2005, SAN DIEGO, CA**

IUPS 2005 is being organized by the six member societies of the U.S. National Committee of the IUPS, the American Physiological Society, the Society for Neuroscience, the Microcirculatory Society, the Society of General Physiologists, the Biomedical Engineering Society, and the Society for Integrative and Comparative Biology, under the auspices of the U.S. National Academy of Sciences. For further details see the meeting website at <http://www.iups2005.org/>

### **EXPERIMENTAL BIOLOGY 2005**

The Experimental Biology 2005 meeting will be a joint meeting with the International Union of Physiological Sciences. IUPS programming will replace the programming normally provided by APS sections and groups. However, in order for both the IUPS and APS Sections and Groups to have input at this meeting, given the somewhat different organization required, at the last meeting of the ETG Steering Committee (EB03), Tom Kleyman asked the committee to identify five "hot topics" of interest to epithelial physiology that could be presented to the Joint Programming Committee at their meeting in June for evaluation prior to being presented to the US Scientific Programming Committee. Working in parallel with the USSPC is the International Scientific Programming Committee, (ISPC) which will make the final decisions concerning the program for EB05. Walter Boron is Chair of both of these committees. The following "hot topics" were identified: architecture and dynamic regulation of tight junctions, including claudins and associated tight junction proteins; vitamin C transporters and their cellular functions; maintenance and determination of epithelial polarity, to include development of epithelia, protein targeting, anchoring of membrane proteins to the cytoskeleton and membrane retrieval of proteins; transport in the hepatic and pancreatic ducts and/or the role of K<sup>+</sup> channels and CFTR; ion channels and sensation of flow, ion concentration, and mechanosensitivity; role of ENaC, Ca<sup>2+</sup> and K<sup>+</sup> channels in extracellular sensing. Approximately 250 proposals for symposia in all areas of physiology were presented for evaluation at the summer JPC meeting. It quickly became apparent that there was considerable overlap between many proposals from different sections and that multiple sessions could be combined to make a single outstanding symposium in some areas. In the event, the JPC broadly rated all

suggested symposia with recommendations for those that could be combined and forwarded these recommendations for consideration by the USSPC. By the time of the 2004 JPC meeting, there should be a much clearer picture of symposia and featured topics that will be scheduled for EB05.

## **APS SUMMER/FALL CONFERENCES**

The APS sponsors a number of conferences held in the summer and fall of each year. These are major conferences on very refined topics. Funds are available from the APS for these conferences, although additional funds from other sources are required. ETG members are encouraged to submit their ideas together with possible organizing committee members and speakers to Linda Allen (Membership Services Manager) [lallen@the-aps.org](mailto:lallen@the-aps.org). If you would like to discuss possible topics and support from the ETG, contact any Steering Committee member.

## **OTHER EVENTS AND ANNOUNCEMENTS OF INTEREST TO THE EPITHELIAL TRANSPORT GROUP:**

### **NOBEL PRIZE IN CHEMISTRY AWARDED TO APS MEMBER PETER AGRE**

The Nobel Prize in Chemistry is being awarded for discoveries concerning channels in cell membranes with one half of the prize to **Peter Agre**, for the discovery of water channels and the other half of the prize to **Roderick MacKinnon** for structural and mechanistic studies of ion channels.

#### **APS Member Wins 2003 Nobel Prize in Chemistry**

Bethesda, MD. – APS member Peter Agre, M.D. has won the 2003 Nobel Prize in Chemistry of the Royal Swedish Academy of Sciences for isolating the membrane protein that acts as the water channel in cells. Agre shares the Nobel Prize in Chemistry with Roderick MacKinnon, M.D. for his work on structural and mechanistic studies of ion channels.

In 1988, Peter Agre succeeded in isolating a membrane protein that, a year or so later, he realized must be the long-sought-after water channel. This decisive discovery opened the door to a whole series of biochemical, physiological and genetic studies of water channels in bacteria, plants and mammals.

Agre has been an active participant in the Society's meetings since his selection as the inaugural Carl W. Gottschalk Distinguished Lecturer of the APS Renal Section in 1994. In 2004, Agre will be the Hugh Davson Distinguished Lecturer of the APS Cell &

Molecular Physiology Section. His lecture, entitled, "Aquaporin Water Channels at the Convergence of Physiology and Medicine" is scheduled for presentation on Monday, April 19, 2004, at the Experimental Biology meeting in Washington, D.C.

Agre is Professor in the Department of Biological Chemistry at Johns Hopkins University School of Medicine in Baltimore, MD. He has been an APS member since 1998 and has been active in several of the Society's disciplinary sections including Renal and Cell and Molecular Physiology.

Agre earned his bachelor's degree in chemistry from Augsburg College, Minneapolis in 1970. He received his medical degree from Johns Hopkins University in 1974. In 1981, after post-graduate medical training and a fellowship at the University of North Carolina at Chapel Hill, Agre returned to Johns Hopkins, where he progressed through the ranks of the departments of medicine and cell biology. In 1993, he became a professor in the department of biological chemistry, a position he still holds.

For more information on Agre and his Nobel winning research, go to:

<http://www.nobel.se/chemistry/laureates/2003/press.html>

<http://www.hopkinsmedicine.org/press/2003/October/031008A.htm>

## **HUMAN MEMBRANE TRANSPORTER GENE FAMILIES**

The Human Genome Organization (HUGO) Nomenclature Committee Database includes more than 40 transporter families of the so-called SLC (solute carrier) gene series. The SLC tables - originally prepared by the authors of the SLC mini-review series of Pflügers Archives - give the latest updates of the SLC families and their members as well as relevant links to gene databases and reviews in the literature. The SLC tables of the HUGO Transporter Gene Families are now available on line:

<http://www.pharmaconference.org/slctable.asp>

## **MEETING AND COURSE ANNOUNCEMENTS**

### **Ohio Physiological Society Meeting**

November 12, 2003. Details on the web at <http://www.the-aps.org/chapters/ohio/ohiombr.htm>

### **Experimental Biology 2004 : Physiology In FOCUS Large Scale Systems Biology**

April 17-21, 2004. Organized by John A. Williams. For further information see <http://www.the-aps.org/meetings/eb2004/program.htm>

## **West Coast Salt and Water Club**

The West Coast Salt and Water Club is a group of physicians and scientists who share common interests in ion and solute transport, epithelial cell biology, and intracellular regulatory mechanisms in a range of systems. Our annual meeting provides a forum for post-graduate Fellows and senior scientists to present their work on a variety of subjects, including membrane biology, ion channels and pumps, and intracellular homeostasis. Presentations are welcome from investigators from many different disciplines and clinical subspecialties representing the entire range of organ, tissue, cell and molecular research. The venue will again be the Inn at Morro Bay. Located in Morro Bay State Park, far from freeways and adjacent to a large nature preserve, golf, hiking trails, and a protected bay, it has proven to be a magnificent setting for the meeting. The Club's program will start with a guest speaker and buffet dinner and wine tasting on Friday evening, March 12, 2004, and extend through Saturday night, March 13, 2004. Please note that a Friday check-in date (i.e., two night stay) is required to qualify for the special meeting rate this year. As is the tradition, a spectacular gala dinner for the Club has been arranged for Saturday night. This year's program is organized by Dr. Chris Lytle from UC Riverside. We are privileged to have two special guest speakers: Dr. John Forte (UC Berkeley), who will be giving a talk entitled The gastric parietal cell as a membrane trafficking/fusion model, and Dr. Marshall Montrose (Indiana University School of Medicine), who will be giving a talk entitled Imaging the epithelial barrier: strategies in the stomach and small intestine for keeping the world at bay. If you would like to present a research talk during the program, please be sure to include its title on your registration form. Forms and additional information concerning the meeting will be available at our website ([www.wcswc.org](http://www.wcswc.org)) in December. Please note that the deadline for early registration is February 16, 2004. Contact: Richard Lubman, M.D. [rlubman@usc.edu](mailto:rlubman@usc.edu)

## **PharmaConference 2005: Membrane Transporters: Bridging Basic and Applied Sciences, August 14-18, 2005. St. Gallen, Switzerland.**

Tentative topics include: physiology and pathology of transporters, structure-based aspects of transporter function, defining transporters as relevant drug targets (e.g., postgenomic informatics, emerging transporters targets, etc.), and case studies in transporter drug discovery (tactical aspects of drug discovery around specific targets, etc.). Please see the preliminary website for more information: <http://www.pharmaconference.org/2005.html>

## **POSITIONS AVAILABLE**

**The Department of Physiology and Biophysics, University at Buffalo, SUNY** invites applications to a tenure track position at the rank of **Associate or Assistant Professor**

to fill the first of several faculty positions in renal physiology that the school expects to fill. We are seeking an outstanding individual with a PhD and/or MD degree, who uses contemporary proteomic, genomic, cell biological and/or biophysical and physiological approaches to study kidney function. He/she will be expected to maintain an independent and vigorous research program and participate in departmental programs. We provide a very supportive environment for research and teaching, and have excellent opportunities for participation in interdisciplinary programs. Send CV, statement of research plans and 3 letters of recommendation to Dr. Harold C. Strauss, Chairman, Department of Physiology and Biophysics, UB, SUNY, SMBS, 124 Sherman Hall, 3435 Main Street, Buffalo, NY 14124. UB, SUNY is an Affirmative Action/ Equal Opportunity Employer.

**Senior Research Scientists – Opportunities in Ireland – Molecular Medicine  
Royal College of Surgeons in Ireland**

The Molecular Medicine Research Centre at the Royal College of Surgeons in Ireland (Dublin [www.rcsi.ie](http://www.rcsi.ie)) seeks to recruit two senior researchers (minimum 5 years post-doctoral experience) in the areas of receptor biology, cell signaling, electrophysiology, and/or molecular endocrinology to act as project team leaders in a five-year program investigating the receptors, cell signaling cascades and membrane targets of rapid responses to steroid hormones (RRSH) in epithelia. The candidates will be expected to be of the caliber to apply for their own funded programs as Principal Investigators to Science Foundation Ireland ([www.sfi.ie](http://www.sfi.ie)) over the duration of the 5 year RRSB program. For further details contact Brian Harvey at [bjpharvey@rcsi.ie](mailto:bjpharvey@rcsi.ie).

**Postdoctoral positions** are available in the **Intracellular Regulation Section, Laboratory of Pharmacology and Chemistry, NIH/NIEHS** to study mechanisms of xenobiotic transport across the blood-brain and blood-cerebrospinal fluid barriers. We are defining transport at the molecular, cellular and tissue levels and working towards an understanding of transporter regulation over the short-term and long-term. Our overall goals are to manipulate transporter expression and function, facilitating drug access to targets within the central nervous system while still providing protection against toxic chemicals. Current projects involve the following transporters: p-glycoprotein, Mrp2, Mrp4, Oat1 and Oat3. Applicants must have a PhD and/or MD in pharmacology, physiology, molecular biology, cell biology, biochemistry or a related field and must not possess more than five years of postdoctoral experience. An understanding of basic principles of membrane transport and gene regulation would be helpful. To apply, email or mail a cover letter, curriculum vitae, bibliography, and names of three references to: Dr. David S. Miller ([miller@niehs.nih.gov](mailto:miller@niehs.nih.gov)), Laboratory of Pharmacology and Chemistry, NIH/NIEHS, P.O. Box 12233, Research Triangle Park, NC 27709.

# EPITHELIAL TRANSPORT GROUP STEERING COMMITTEE

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