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Inside

A New Age Dawning

When 28 physiologists gathered in 1887 to found the American Physiological Society, they were attempting to create an organization that would contribute to the dissemination of scientific information. In their minds, the Society would provide this service through its meetings, not the publication of words. Many of the founders, having been trained in England, were familiar with the British *Journal of Physiology*, and it was anticipated that this journal would provide American physiologists with a vehicle for the dissemination of their work.

Unfortunately, perception and reality are often at odds with each other. Consequently, by 1894, there was clear interest on the part of APS members to begin publishing a physiology journal of their own. Finally approved in 1897, the *American Journal of Physiology* began publishing in 1898 under the editorship of William Townsend Porter. While there was no formal review process at the outset, Porter was said to have reviewed the manuscripts and returned them to authors for revision prior to their publication in *AJP*.

As members and authors are aware, the traditions of Porter continue in the current *AJP*, which provides the physiological community with an avenue for the publication of physiological information. Today, in a consolidated version as well as in its individual parts, the journal publishes more than 2,500 manuscripts and nearly 20,000 pages of text. A world-renowned journal, it ranks 14th for total citations among all scientific journals and is one of the leading physiological journals in impact factor.

The initiation of the *American Journal of Physiology* is an event that will be noted during the forthcoming centennial celebration of the journal's birth. In 1998, the Society will attempt to tie the current journal to its founding by publishing a history of *AJP*, as well as articles designed to explore how various fields of physiology have progressed during the last 100 years. The *AJP* journal editors and associate editors will be involved in identifying early articles for discussion and perhaps inclusion in their journals during the centennial year.

As we experienced during the 100-year anniversary of the Society, centennial celebrations not only provide opportunities for reflection but also give us an opportunity to look to the future. As in those early days, it is imperative that our Society remain at the forefront of information dissemination, whether it be through meetings or through publications. As each of us is aware, paper publications and meetings are no longer the only vehicles for information dispersal. Starting in 1990, binary code became a primary vehicle as the Internet grew and expanded as a dissemination vehicle.

APS has attempted to anticipate this new age by participating in the dissemination of physiological and Society information over the Internet. In December 1992, APS became one of the first scientific societies to have a gopher server from which users could obtain information about the Society and its meetings, publications, and other activities. In January 1994, the Society began publishing its first electronic journal, *APStracts*, an online publication of abstracts of accepted manuscripts. *APStracts* initially only contained abstracts from the *American Journal of Physiology: Cell Physiology* and was available exclusively on the Society's gopher server. However, by 1995, *APStracts* had been expanded to include abstracts from all the Society's journals and was available both on gopher and the World Wide

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A New Age Dawning

Figure 1. APS Home Page: **http://www.faseb.org/aps**.

(continued from page 1)

Web. These sites provide the entire research community with free access to the Society's scientific literature.

The development of the APS Home Page (Fig. 1) at the end of 1995 represents a continuance of our efforts to make physiological information available to all interested individuals. Both scientific and lay members of the public use the site to obtain information about the Society, its many educational programs, and the discipline of physiology. In the future, it might even serve as a window through which students can ask questions about physiology that would be answered by APS members.

The gopher and Web-based sites of the Society represent a beginning, not an end. While the community still uses these sites to obtain physiological information (Table 1), there is a new age dawning that will see full-text journals available on the Web. Recently, the Society formalized an agreement with HighWire Press/Stanford University to publish the *Journal of Applied Physiology Online* (Fig. 2) starting in April 1997 at **http://www.jap.org**.

Initially, the public and APS members will have unrestricted access to the full-text version of *JAP Online*. The product will be fully searchable, printable, and linked to Medline references. However, after August 1997, the user will either have to be a member or a subscriber to the print journal in order to gain access. Only APS members will be able to access the on-line journal without purchasing a print journal. In the near future, APS members will receive a letter informing them how to access the *Journal of Applied Physiology Online*. As a member, you will be able to register search parameters to arrange for e-mail notification of new articles in your area of research. In addition, you will receive advance notification of forthcoming articles, as well as many other exciting and beneficial member features.

Table 1. Utility of the Society's Internet sites

Internet Site	Unique Hosts	Connections
APS Gopher Site	2,852	8,549
APStracts on the Web	8,099	75,116
APS Home Page	1,475	19,170

December 1996 statistics

A New Age Dawning

Starting in 1998, the price paid by print subscribers will provide them with on-line access to the journal. Members will be asked to pay a modest fee of $49.50 for on-line access to the *Journal of Applied Physiology Online*, a fee that will provide users with all available special member services. This fee is not a subscription fee but represents an annual access fee that will allow APS members to access all APS journals available on the Web. As additional APS journals are made available on-line, the Society will endeavor to keep this same annual fee in order to provide the membership with complete and total access to the APS literature. The *Journal of Applied Physiology* will be the first on-line journal in 1997, followed by the *Journal of Neurophysiology* in 1998 and the *American Journal of Physiology* by the year 2000.

It is truly the dawning of a new age! APS members will be able to have complete on-line access to the entire APS journal collection for a low access fee that will be hundreds of dollars less than what a member currently pays for the print journals. This new venture will truly provide the membership with a unique opportunity to take advantage of the integrative nature of the Society's publication program.

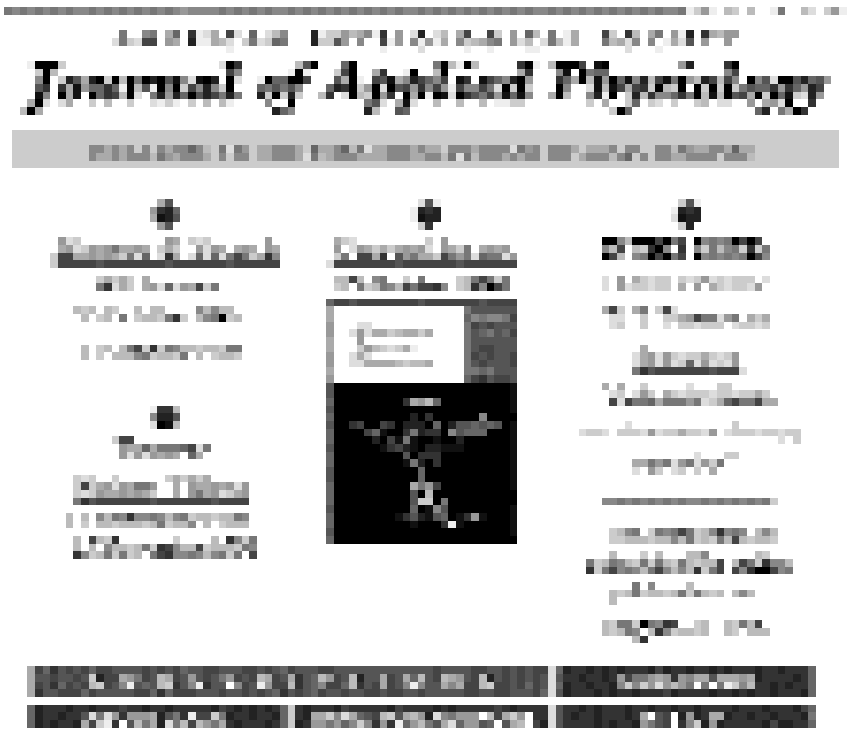

Figure 2. JAP Online: **http://www.jap.org**.

The Society hopes you will join us in cyberspace to experience our new on-line journal program. ❖

Martin Frank

Council Meets on Captiva Island, FL

The APS fall Council meeting was held at the South Seas Plantation on Captiva Island, Florida, on December 5, 1996, in conjunction with the annual meeting of the Association of Chairmen of Departments of Physiology (ACDP) on December 6-8, 1996. Instead of devoting the fall Council meeting to a review of some aspect of the APS Strategic Plan, the Council met with the ACDP to consider how APS and ACDP can work together to address the problems facing physiology as a discipline and as an academic department.

APS Council. Back (l to r): John Williams, Ethan Nadel, Gerald DiBona, Leonard Johnson, Heinz Valtin, Celia Sladek, Francis Belloni, Edward Blaine, Walter Boron. Front (l to r): Diana Kunze, James Schafer, Allen Cowley, Jr., Leonard Jefferson.

During the Council meeting, as is normally done each fall, Council accepted the revised 1996 budget based on the actual figures from the first six months of the year and the proposed 1997 budget as recommended by the Finance Committee chaired by **Edward Blaine**. Council also approved the Finance Committee's recommendation to use 4% of the value of the tum Suden account to provide increased support for the Professional Opportunity Award Program, enabling the number of awards given out each year to be increased from 12 to 18-20.

Council approved two new features for the Experimental Biology meeting: in 1997, an A. Clifford Barger Memorial Symposium, which has been selected to be "Pathophysiology of Cardiorenal Systems in Obesity" chaired by **John Hall**; and in 1998, a Walter B. Randall Lecture in Biomedical Ethics. Although there will be no "Hot Topic" symposia in 1997, as the proposals submitted were not judged by the Program Committee to be "hot" enough, this has created the opportunity for the Program Committee and Chair **Ethan Nadel** to develop some exciting programming in those slots.

President-elect **Allen Cowley, Jr.**, presented an update on the upcoming APS-sponsored conference "Genomics to Physiology and Beyond: How Do We Get There?" that will be held February 23-26, 1997, at the Banbury Center at Cold Spring Harbor Laboratory. Leaders in the fields of genetics and physiology will be coming together to discuss how to take the information being gathered by the geneticists about the genetic code and put it to use in the whole organism.

Joint APS Council/ACDP Executive Committee. Back (l to r): Gerald DiBona, John Williams, Aubrey Taylor. Middle (l to r): Ethan Nadel, Walter Boron, Diana Kunze, Antonio Scarpa, Celia Sladek, Sandra Sabatini, Edward Blaine, Francis Belloni, Heinz Valtin, Mordecai Blaustein. Front (l to r): Leonard Jefferson, Allen Cowley, Jr., L. Gabriel Navar, James Schafer, Paul De Weer, Robert Foreman.

The celebration of the upcoming centennial of the *American Journal of Physiology* in 1998 has been finalized by a special committee headed by **John Williams**. Plans include a special cover; a brief editorial on the history and future of the journal by **Leonard Johnson**, the Chair of the Publications Committee; a reprinting of the 1898 table of contents; a shortened history of the last 10 years of the journal; and a journal-specific celebratory article from the early issues or from landmark articles published in the journal. The other journals of the Society have been invited to join in the celebration as well. The soon-to-be-published *Journal of Applied Physiology Online* will be available to the general scientific public in April 1997. Access to the journal will be free for 1997 but limited to subscribers and members beginning in July or August. Payment for

access to the journal will not begin until January 1998. Council approved giving the on-line version of the journal away free with a paid subscription to the paper version. Only members will be able to get the *Journal of Applied Physiology Online* by itself and then for an access fee of $49.50. Plans were approved for scheduling the on-line publication of the *Journal of Neurophysiology* in January 1998.

Another exciting venture for the Society has come about through the recommendation of the International Physiology Committee chaired by **Ernst Knobil**. APS will be contracting with SatelLife, an international not-for-profit organization devoted to communicating scientific and medical information to areas of the developing world, to allow access to the APS databases and other informational resources by the physiologists of the world through the use of modern electronic communication technology. The potential users of HealthNet, the communication network of SatelLife, currently include 4,000 scientists from 27 countries, although plans for the coming year include expansion to an additional 10 countries.

The joint meeting with the ACDP was organized by **James Schafer**, President of APS, and **L. Gabriel Navar**, President of ACDP, in the hopes that the two organizations with their obvious connection through physiology would use the unique opportunity to find ways to work together toward common goals. To that end, the meeting included talks on subjects of common interest, which were followed by small-group workshops designed to develop some consensus on the issues and recommendations for action items that could be presented to the joint group. The three main issues were challenges in medical education and testing, emerging trends in graduate education, and outreach programs for physiology departments. Each workshop was led jointly by a member of the APS Council and the ACDP Executive Committee. The recommendations to come from the workshops that were accepted by the joint group included the following: work toward the development of a physiology core curriculum; begin developing a questionnaire that will aid in the collection of data on career choices made by physiology graduate students after receiving their degrees; encourage an increased emphasis on mentoring, especially with regard to career opportunities other than those traditionally followed; and develop a resource center for information on current outreach programs being carried out by departments in their communities. Overall, both APS and ACDP expressed great satisfaction with the recommendations to come from the joint meeting and the atmosphere of cooperation that existed between the two organizations. APS looks forward to a much closer working relationship with the ACDP.❖

1996 ACDP Distinguished Service Award to Arthur C. Guyton

It is difficult to think of any individual more deserving of this award for Distinguished Service than **Arthur C. Guyton**. For half a century, Guyton has made sustained and extraordinary contributions to medical education and impressive achievements in physiology. His *Textbook of Medical Physiology*, now in its ninth edition, is one of his many achievements in a long and illustrious career. There are few physicians who went to medical school during the last three to four decades not familiar with his textbook of physiology. Through this textbook, Guyton has contributed to the physiology education of thousands of physicians and physiologists throughout the world.

Arthur C. Guyton receiving the Distinguished Service Award from ACDP President L. Gabriel Navar.

Guyton's accomplishments go far beyond his well-known textbook. He is the author of numerous other books ranging in scope from textbooks used for undergraduate courses to advanced monographs on specialized topics. Through these various publications, Guyton has contributed to the education of an immense number of students in many different fields. In so doing, he has served as a great advocate for the discipline of physiology.

In his capacity as Chairman of the Department of Physiology and Biophysics at the University of Mississippi for more than 30 years, Guyton made extraordinary contributions to many aspects of medical and graduate education and physiological research. He was instrumental in the formation of the full four-year medical school in Mississippi. He served on many committees, at all levels, helping to mold modern medical education. He also established an outstanding graduate training program in physiology and biophysics, where students came from many parts of the world for predoctoral

or postdoctoral training. His emphasis on solid training in quantitative physiology and physiological control systems led to well-grounded independent physiologists who have gone on to staff physiology departments throughout the world. Many of his former trainees have become chairs of physiology departments. These chairs have stretched Guyton's influence on medical education to most parts of the US and many parts of the world. Several of his former graduate students and postdoctoral fellows who are now departmental chairmen were at the ACDP meeting. These included **Aubrey Taylor**, **Allen Cowley, Jr.**, **John Hall**, **D. Neil Granger**, **Thomas Coleman**, and **L. Gabriel Navar**.

Former students of Guyton presenting ACDP Distinguished Service Award. (l to r): Thomas Coleman, Allen Cowley, Jr., D. Neil Granger, John Hall, Arthur C. Guyton, Aubrey Taylor, L. Gabriel Navar.

It should also be emphasized that Guyton has made outstanding scientific contributions that have had a profound influence on our current concepts related to the control of cardiovascular function, body fluid homeostasis, and the control of arterial pressure. These concepts have continued to gain recognition and have greatly facilitated our understanding of fundamental pathophysiological mechanisms and, in particular, on the pathophysiology of hypertension. These contributions have had a great impact on our conceptual basis of cardiovascular physiology, physiology of body fluid regulation, and pathophysiology of hypertension. Guyton's imaginative and innovative approach to research led to many breakthroughs in the understanding and treatment of cardiovascular disease.

During all these years of sustained contributions to research in the physiological sciences and to medical and graduate education, Guyton also served in many professional societies. He served with distinction as President of the American Physiological Society. He has received many honors from local, state, national, and international societies. These include the Carl Wiggers Award, the American Heart Association Research Achievement Award, the CIBA Award, the William Harvey Award, and the Abraham Flexner Award. During these times, he contributed unselfishly to furthering the biomedical research enterprise in general and the discipline of physiology in particular. Based on all his outstanding contributions during an extended period of service, ACDP is pleased to award this year's ACDP Distinguished Service Award to Arthur Guyton.❖

Correction

On page 390 of the December 1996 Physiologist, we published a photograph of the 1996 Intersociety Meeting student awardees from Vancouver, British Columbia.

The caption for the photo incorrectly listed Meeting Organizer **Peter D. Wagner** as being in the picture. He was not. All those pictured in the photo were student awardees.

The American Physiological Society regrets the error.❖

G. Edgar Folk, Jr., Senior Physiologist Fund

The G. Edgar Folk, Jr., Senior Physiologist Fund has been set up through the generosity of family and former graduate students and postdoctoral fellows to provide modest but helpful assistance to senior physiologists 70 years or older who no longer have grant funds available to them.

The awards might be used for such purposes as attending an APS meeting to present a paper, engaging in a series of modest experiments, or completing a manuscript (paying for typists or perhaps page charges). Recipients will be selected with the assistance of the Senior Physiologists Committee throughout the year. Names of awardees will not be made public. Mary Folk writes that the purpose of the fund is for the Senior Physiologists Committee "to have *fun* assisting colleagues and for Emeritus APS members to keep in closer touch with APS."

Inquiries concerning the G. Edgar Folk, Jr., Senior Physiologist Fund should be made to Martin Frank, Executive Director, APS.❖

1996 Research Career Enhancement Awards

The Research Career Enhancement Awards are designed to enhance the research careers of APS members in good standing, strengthening their research programs and making them more competitive scientists. The awards are given competitively twice a year.

In 1996, the fall round of applications resulted in five of ten applications being accepted, those of Joseph W. Barnard, Dona F. Boggs, Scott K. Powers, Chris R. Ross, and Adam M. Sun.

Joseph W. Barnard, Rush Medical College, will use the award to attend two classes at Cold Spring Harbor Laboratory: "Advanced In Situ Hybridatization and Immunocytochemistry" and "Recombinant DNA Methodology."

The award to **Dona F. Boggs,** University of Montana, will enable Boggs, a comparative animal physiologist working at the whole organism level, to follow questions that have arisen from such studies down to the tissue and ultimately cellular level. She will spend two weeks in the laboratory of David Donnelly, Yale University, to learn isolated carotid body techniques, including patch clamping. Boggs also hopes to learn some basic molecular biological techniques that will enable her to isolate cell membranes and intrinsic proteins from these cell membranes.

Scott K. Powers, University of Florida, will spend three to four weeks in the laboratory of Lester Packer, University of California at Berkeley, to gain experience in two areas of research: measurement of protein carbonyls in heart and skeletal muscle using Western analysis to identify specific oxidized proteins and measurement of mRNA for superoxide dismutase and glutathione peroxidase using slot-blot techniques to study gene expression in skeletal muscle and heart exposed to oxidative stress.

The research of **Chris R. Ross**, Kansas State University, involves investigating temporal and causal associations between expression of PR-39 and the inducible forms of syndecan, syndecan-1, and syndecan-4. Ross has received probes for use in his studies from Merton Bernfeld, Harvard Medical School. Ross will use the award to visit Bernfeld's laboratory to learn the specific methodology used in dealing with these probes.

Adam M. Sun, Brown University School of Medicine, will use the award to visit the laboratory of Gary Shull, University of Cincinnati, to learn the molecular biological techniques required for genotyping the Na^+/H^+ exchanger knockout mice (isoforms NHE2 and NHE3). These techniques will be used by the applicant to manage his own colonies of mice. In addition, the applicant plans to learn the gene targeting and other techniques necessary for developing a type II $Cl^-:HCO_3^-$ exchanger (AE2) gene knockout mouse.

APS members in good standing are invited to apply for Research Career Enhancement Awards. The deadlines for applications are February 15 and August 15. ❖

SCAW Honors Bustad

The Scientist Center for Animal Welfare (SCAW) honored APS member **Leo K. Bustad** in December with its 1996 Harry C. Roswell Award for his national and world leadership in promoting the use of animals to help people, especially the elderly and disabled.

Bustad, a professor and former dean at the College of Veterinary Medicine at Washington State University in Pullman, WA, has authored or coauthored more than 200 articles and reports on education, energy, nutrition, radiation, cancer, laboratory animal medicine, comparative medicine, and the human-companion animal bond. In fact, the American Veterinary Medical Association's award to a veterinarian for exemplary work in promoting the human-animal bond is named after Bustad.

The veterinary science building at Washington State University is named for Bustad, as well. He is a member of the National Academies of Practice, president emeritus and cofounder of the Delta Society for the Study of the Human-Companion Animal Bond, and senior member of the Institute of Medicine of the National Academy of Sciences. ❖

Deceased Members

Robin A. Barraco	Detroit, MI
Mary A. B. Brazier	North Falmouth, MA
Helene C. Cecil	Silver Spring, MD
John C. Finerty	Houston, TX
Louis B. Flexner	Philadelphia, PA
Stephen W. Gray	Atlanta, GA
James P. Henry	Los Angeles, CA
Charles B. Huggins	Chicago, IL
Herman Kabat	Saunderstown, RI
Raymond F. Kline	Xenia, OH
Ross C. Kory	Williamsburg, VA
Jacob Krier	East Lansing, MI
I. Alden MacChi	Newton, MA
Louis J. Pecora	Potomac, MD
Walter C. Randall	Upland, IN
Jorgen U. Schlegel	Chapala Jalisco, Mexico
David H. Schlesinger	Plainboro, NJ
Theofilos J. Tsagaris	Salt Lake City, UT

Election of New Regular Members (72)

* Upgrade from Student Member

Abdel A. Abdel-Rahman
East Carolina University
Yalchin G. Abdullaev
Univ. of Louisville Health Science Ctr.
Cory G. Acuff
University of Texas
Marilyn Ader
University of Southern California
J. P. Advis
Rutgers University
Carolyn D. Berdanier
University of Georgia
Richard M. Breyer
Vanderbilt University
Sandra E. Burke
Abbott Laboratories
Xiaoli Chen
Monsanto/Searle
Andrea J. Cohen
University of Colorado
Maria J. Crespo
University of Puerto Rico
Norman R. Curthoys
Colorado State University
Mita Das
University of Colorado
James Duffin
University of Toronto
Graeme Eisenhofer
NIH
Carol A. Everson
University of Tennessee
Eberhard E. Fetz
University of Washington
***Jason Fewell**
Children's Hosp. Medical Ctr. (OH)
Christine M. Finck
SUNY, Syracuse
Shawn Flanagan
University of Iowa
Warren D. Franke
Iowa State University
Ernest J. Freeman
Calhoun Research Laboratory
***Carolina Arruda Freire**
Centro Politecnico
Patricia J. Gallagher
Indiana University
Robin E. Gandley
Magee-Womans Research Institute (PA)
Phillip Gardiner
University of Montreal
Edwin E. Gilliam
University of Arizona
John D. Griffin
Harvard Institute of Medicine
Rajash K. Handa
Washington State University
Ruth B. S. Harris
Pennington Biomed. Research Cen. (LA)
Jon F. Harrison
Arizona State University
Gabriel J. Hauser
Georgetown University Medical Center
Brian P. Herring
Indiana University
Margery K. Herrington
Creighton University
***Christopher Paul Ingalls**
Texas A&M University
Howard J. Jacob
Medical College of Wisconsin
Biljana Jovov
University of Alabama at Birmingham
John P. Kirwan
The Pennsylvania State University
Randy D. Krauss
Boston University
Benjamin D. Levine
Inst. for Exercise and Enviro. Medicine
C. Tony Liang
NIA, NIH
***Donna L. MacIntrye**
University of British Columbia
Ravi B. Marala
East Carolina University
Manuel R. Martinez
U.A.S.L.P., Mexico
David L. Mattson
Medical College of Wisconsin
Todd A. McBride
University of California at Davis
Lisete C. Michelini
University of Sao Paulo
Francis C. Miller
University of Iowa
Frederick C. Morin
SUNY at Buffalo
***Al C. Ngai**
Harborview Medical Center
Patrick J. Pagano
Boston University Medical Center
Fredrick M. Pavalko
Indiana University
***John A Payne**
University of Calfornia at Davis
Michael A. Portman
University of Washington
Nelson Rich
Collin County (TX) Comm. College
Allen F. Sanborn
Barry University
Bruce D. Schultz
University of Pittsburgh
***Irene C. Solomon**
SUNY at Stony Brook
Philip F. Solter
Univ. of Illinois College of Vet. Med.
Jill L. Sondeen
US Army Inst. of Surgical Research
David W. Stepp
University of Washington
Stanislav I. Svetlov
Univ. of Texas Health Sciences Ctr.
W. Robert Taylor
Emory University School of Medicine
Suresh C. Tyagi
University of Missouri
Elisardo Corral Vasquez
Biomedical Center, UFES
Angela Xue-ping Wang
University of South Carolina
Steven M. Weldon
Boehringer Ingelheim Pharm, Inc.
***Blair O. Wolf**
Univ of Arizona Coll. of Medicine
Roger T. Worrell
Emory University School of Medicine
David Ian Yule
University of Michigan
Guo He Zhang
Univ. of Texas Health Sciences Ctr.
Lubo Zhang
Loma Linda University

Election of New Corresponding Members (33)

Caroline B. Appleyard
University of South Dakota
Metin Avkiran
The Rayne Institute, UK
Veronique Billat
University of Paris, France
Abderrezak Bouchama
King Faisal Specialist Hosp., France
***Jie-Guang Chen**
Yale University
Christine Delporte
Free University of Brussels, Belgium
Christophe Depre
University of Louvain, Belgium
Dirk J. G. M. Duncker
Erasmus University, The Netherlands
Sophie Fagette
Cent. National D'etudes Spatales, France
Jorgen Frokiaer
Skejby University Hospital, Denmark
Helge Uwe Hebestreit
University of Kinderklinik, Germany
Carsten Juel
August Krogh Institute, Denmark
Osamu Kozawa
Gifu University, Japan
Dae Taek Lee
US Army Res. Inst. of Enviro. Med., Korea
Christiaan Leeuwenburgh
Washington University
***Ian John LeGrice**
University of Auckland, New Zealand
Ming Lu
New York Medical College
J. K. Mukkadan
Little Flower Med. Research Ctr., India
Mikko Juhani Nikinmaa
University of Turku, Finland
Takeshi Nishiyasu
The John B. Pierce Laboratory
Hakan Sedat Orer
Hacettepe University, Turkey
Niranjan Parekh
University of Heidelberg, Germany
Johannes A. Romijn
Univ. of Amsterdam, The Netherlands
Janusz B. Sadowski
Polish Academy of Sciences, Poland
Herbert Schramek
University of Innsbruck, Austria
Bruce Henry Smaill
University of Auckland, New Zealand
Kerst Stelwagen
Ruakura Res. Centre, New Zealand
Xenia Tiglao Tigno
Univ. of Philippines, The Phillippines
Vittorio Tomasi
University of Bologna, Italy
Nina K. Vollestad
University of Oslo, Norway
Lars Walloe
University of Oslo, Norway
Wendy Walwyn
University of California at Los Angeles
Yingkui Yang
University of Michigan

Election of New Student Members (29)

Steven Sung-Chur An
Brown University
Michael E. Bizeau
Arizona State University
Douglas J. Casa
University of Connecticut
Nipon Chattipakorn
University of Alabama at Birmingham
Stephen Dukacz
University of Western Ontario
Ingrid Edgemon
University of Tennessee
Michael Godard
Columbia University
Dawn Gorham
Univ. of Wisconsin Sch. of Vet. Med.
Kristin L. Gosselink
University of California at Los Angeles
Jorge A. Herrera
University of Connecticut
Janene Kingston
Washington State University
Dongsheng Liu
University of Rochester
Brian J. Mateja
Michigan State University
Gita Murthy
University of California at Berkeley
John Peever
University of Toronto
Sandra Peters
University of Guelph
Dilson Jose Etcheverry Rassier
University of Calgary
John C. Robertson
Arizona State University
C. Max Schmidt
Georgetown University
David A. Schneider
University of Georgia
Gregory Shearer
University of California at Davis
Creed M. Stary
University of California at San Diego
Neil Arun Tolani
University of California at Berkeley
Linda Tompkins
University of Arizona
Randall L. Tracy
Arizona State University
Jacqueline Eleanor Vigilance
University of the West Indies
Kelly M. Weixel
University of Pittsburgh
Lisa Wiley
University of British Columbia
Stacey J. Wilson
University of Missouri

Affiliate Members (1)

Jan Hamilton
Georgetown University

Introducing ... Sue Amy Shapses

Effective January 1997, Sue Amy Shapses succeeded Hannah Carey as the chair of the APS Membership Committee. Shapses has served on the Membership Committee for more than two years and is familiar with the requirements and procedures required during the application process.

Shapses is an assistant professor in the Department of Nutritional Sciences at Rutgers University in New Brunswick, NJ. She received her doctoral degree from Columbia University in 1988 in the fields of nutrition and respiratory physiology (as Sue Goldstein). Her studies were instrumental in determining the metabolic and ventilatory work required for malnourished patients with emphysema. This ultimately led to the current dietary recommendations for patients with emphysema and was the basis for enteral formulas designed for these patients. After two postdoctoral positions (in the Department of Medicine at Albert Einstein School of Medicine in Bronx, NY, and in the Orthopaedic Biochemistry Department at Columbia's College of Physicians and Surgeons in New York), Shapses went to Rutgers University, her present position.

Shapses research focus is on the biology of bone, specifically in the nutritional regulation of bone turnover during changes in body weight. This work is supported by several sources, including NIH.

Shapses served as President of the New Jersey Chapter of the American Society of Parenteral and Enteral Nutrition for the past year and currently holds the position of Basic Science and Education, Director at Large.

Shapses notes, "I encourage all members to recommend their colleagues and students join APS. I remember joining APS as a graduate student after one of my papers was accepted to the *Journal of Applied Physiology*. It was the first professional research society I joined, and hence, my allegiance to the Society was established early in my career. The cost of student membership is minimal, and the transition from student to regular member is easy. I see this as a great opportunity to increase membership. I enjoy APS because it is a unique Society that includes researchers with a broad range of interests. I am optimistic we will continue to have the highly qualified applicants I have seen apply in the past two years. It is expected through these new members we will be able to enhance the quality of the Society and meet the goals of APS." ❖

APS Sustaining Associate Members

The Society gratefully acknowledges the contributions received from Sustaining Members in support of the Society's goals and objectives.

Abbott Laboratories
Alliance Pharmaceutical Corporation
American Medical Association
Amgen, Inc.
Astra Arcus USA, Inc.
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Genentech, Inc.
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Harvard Apparatus
Hoechst Marion Roussel, Inc.
Hoffmann-LaRoche Inc.
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The Mack Printing Group
Merck & Company, Inc.
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Pfizer, Inc.
Pharmacia and Upjohn, Inc.
Procter & Gamble Company
Quaker Oats Company
Rhone-Poulenc Rorer
Sandoz Pharmaceuticals Corporation
W.B. Saunders Company
Schering-Plough Research Institute
G.D. Searle and Company
SmithKline Beecham
Wyeth-Ayerst Laboratories

HENRY PICKERING BOWDITCH AWARD

David H. Wasserman
Vanderbilt University

The Study of Glucoregulatory Mechanisms Using the Challenge of Muscular Work

MONDAY, APRIL 7, 5:15 PM
CONV CTR BALLROOM B/C

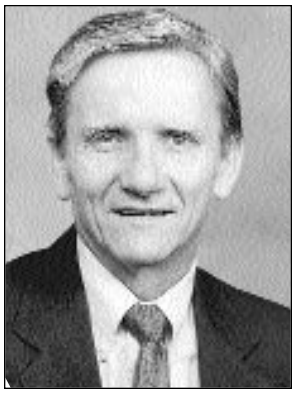
PHYSIOLOGY IN PERSPECTIVE: THE WALTER B. CANNON AWARD LECTURE
(SUPPORTED BY THE GRASS FOUNDATION)

Ernst Knobil
University of Texas Medical School, Houston

The Wisdom of the Body Revisited

SUNDAY, APRIL 6, 5:15 PM
HILTON, GRAND BALLROOM C

Distinguished Lectureships



CARL LUDWIG DISTINGUISHED LECTURESHIP OF THE NEURAL CONTROL AND AUTONOMIC REGULATION SECTION

Vernon S. Bishop
University of Texas Health Sciences Center, San Antonio

Baroreflex Regulation: Effects on Sympathetic Outflow

MONDAY, APRIL 7, 8:30 AM
CONV CTR RM 61/62/63

ERNEST H. STARLING DISTINGUISHED LECTURESHIP OF THE WATER AND ELECTROLYTE HOMEOSTASIS SECTION

Jurgen Schnermann
University of Michigan

Renal Salt Excretion and the Juxtaglomerular Cell Complex

MONDAY, APRIL 7, 8:30 AM
CONV CTR RM 58

HUGH DAVSON DISTINGUISHED LECTURESHIP OF THE CELL AND GENERAL PHYSIOLOGY SECTION

Erwin Neher
Max Planck Institute Germany

A Quantitative Description of Stimulus-Secretion Coupling in Adrenal Chromaffin Cells

MONDAY, APRIL 7, 11:45 AM
CONV CTR BALLROOM C

ROBERT M. BERNE DISTINGUISHED LECTURESHIP OF THE CARDIOVASCULAR SECTION

Loring B. Rowell
University of Washington

Integrated Human Cardiovascular Control: Coping With Small Hearts, Compliant Vessels, and Gravity

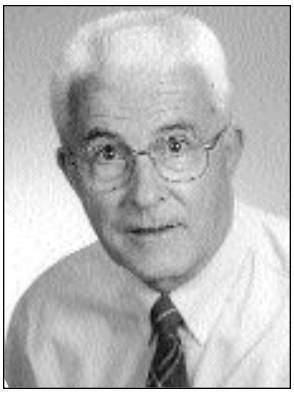
MONDAY, APRIL 7, 12:45 PM
CONV CTR BALLROOM A/B

CARL W. GOTTSCHALK DISTINGUISHED LECTURESHIP OF THE RENAL SECTION

L. Gabriel Navar
Tulane University

Integrating Multiple Paracrine Regulators of Renal Microvascular Dynamics

TUESDAY, APRIL 8, 8:30 AM
CONV CTR RM 61/62/63



EDWARD F. ADOLPH DISTINGUISHED LECTURESHIP OF THE ENVIRONMENTAL AND EXERCISE PHYSIOLOGY SECTION

Claus Jessen
University of Giessen, Germany

The Body Core as a Source of Input Signals to the Temperature Regulation System

TUESDAY, APRIL 8, 8:30 AM
CONV CTR RM 58

HORACE W. DAVENPORT DISTINGUISHED LECTURESHIP OF THE GASTROINTESTINAL SECTION

John B. Furness
University of Melbourne, Australia

Neural Control of Digestive Function:The Intrinsic Circuits

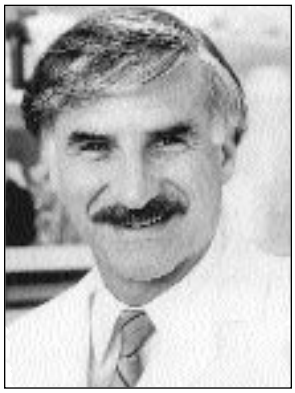
TUESDAY, APRIL 8, 11:45 AM
CONV CTR RM 61/62/63

JOSEPH ERLANGER DISTINGUISHED LECTURESHIP OF THE CENTRAL NERVOUS SYSTEM SECTION

William Pardridge
University of California, Los Angeles

Molecular Regulation of Blood-Brain Barrier GLUT1 Glucose Transporter

TUESDAY, APRIL 8, 12:45 PM
CONV CTR RM 92

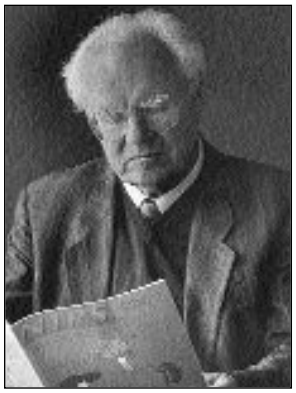


SOLOMON A. BERSON DISTINGUISHED LECTURESHIP OF THE ENDOCRINOLOGY AND METABOLISM SECTION

C. Ronald Kahn
Joslin Diabetes Center, Harvard Medical School

The Intracellular Internet of Insulin Signaling and Its Alterations in Disease

TUESDAY, APRIL 8, 2:00 PM
CONV CTR BALLROOM C



AUGUST KROGH DISTINGUISHED LECTURESHIP OF THE COMPARATIVE PHYSIOLOGY SECTION

Johannes Piiper
Max Planck Institute for Experimental Medicine, Germany

Modeling of Respiratory Gas Exchange, in the Wake of August Krogh

WEDNESDAY, APRIL 9, 8:30AM
CONV CTR RM 61/62/63

JULIUS H. COMROE, JR. DISTINGUISHED LECTURESHIP OF THE RESPIRATION SECTION

Bernard C. Rossier
University of Lausanne, Switzerland

The Epithelial Sodium Channel: New Insights in the Control of Lung Fluid Clearance

WEDNESDAY, APRIL 9, 12:45 PM
CONV CTR RM 61/62/63

APS Annual Business Meeting and Award Presentations

Tuesday, April 8, 5:15 PM
Convention Center Ballroom C
New Orleans, LA

Experimental Biology '97
April 6-9, 1997 • New Orleans, LA

Symposia

Sunday, April 6, 8:30 AM

Refresher Course for Teaching Respiratory Physiology
S. E. DiCarlo

Sunday, April 6, 2:00 PM

Are We Losing Our Expertise With Whole Animal Physiology, and Does That Matter?
C. T. Hawk

Challenges Facing Undergraduate, Graduate, and Medical Physiology Teachers: Are They the Same?
D. R. Richardson

Mathematical Approaches to Cellular Engineering
D. Odde and D. Hammer
(with the **Biomedical Engineering Society**)

The Physiology and Functional Diversity of Amiloride-Sensitive Na^+ Channels: A New Gene Superfamily
D. J. Benos

Sunday, April 6, 6:30 PM

Career Opportunities in Physiology
S. L. Bealer

Monday, April 7, 8:30 AM

Cellular and Molecular Basis of Capillary Permeability
J. E. Schnitzer

Estrogen Replacement Therapy: Benefits, Risks and Future Outlook
M. T. R. Subbiah and B. Sherwin
(with the **Society for Experimental Biology and Medicine**)

Monday, April 7, 12:45 PM

Experimental Biology and NASA in the 21st Century
Daniel Goldin

Monday, April 7, 2:00 PM

Milestones in Thermal Physiology
C. M. Blatteis and J. A. Boulant

Regulating Epithelia From Their Apical Side: Novel New Mechanisms of Autocrine and Paracrine Signaling
K. Karnaky, Jr.

The NO Signal Transduction System in the Lung: From Molecular Biology to Bedside Therapy
W. M. Zapol and K. D. Bloch

Cellular Interactions With Tissue Analogs and Biomaterials
P. V. Moghe and F. Berthiaume
(with the **Biomedical Engineering Society**)

Tuesday, April 8, 8:30 AM

Glucagon-Like Peptide-1 and the Control of Insulin-Glucose Homeostasis
S. Mojsov and E. M. Plisetskaya

Neurobiology of Temperature Regulation: Role of Stress
P. Rowsey, H. Wallace, L. Leon, and W. Reilly

Novel Signal Transduction Mechanisms in the Vasculature
S. W. Watts and C. A. Davison

Genomics to Physiology: How Do We Get There?
A. W. Cowley, Jr.

Molecular Mechanisms of Cell-Cell Interactions Under Dynamic Flow Conditions
L. V. McIntire and J. M. Ross
(with the **North American Society for Biorheology**)

Tuesday, April 8, 2:00 PM

Pathophysiology of Cardiorenal Systems in Obesity
J. E. Hall and A. L. Mark

Vascular Endothelium-Smooth Muscle Communication in the Control of Vascular Function and Growth
A. I. Hassid and D. B. McNamara

Mechanisms of Transport Across the Blood-Brain Barrier
R. A. Hawkins and S. J. Vannucci

Recent Insights Into the Urinary Concentrating Mechanisms: From cDNA Cloning to Modeling Renal Function
M. A. Hediger and M. A. Knepper

Oxygen Sensing Mechanisms in Mammalian Cells
N. R. Prabhakar and S. Lahiri

Point-Counterpoint on Environmental and Exercise Physiology Issues
C. M. Tipton and C. V. Gisolfi

Lipid-Induced Satiety and the Roles of the Gastrointestinal Tract
P. Tso and T. H. Moran

Wednesday, April 9, 8:30 AM

Heat Shock Proteins and Myocardial Protection
R. C. Kukreja and J. M. Downey

Molecular and Physiological Regulation of Intracellular Lipid Transport in the Intestine
C. M. Mansbach and D. Hui

Role of Integrins in Acute Renal Failure
E. E. Simon

The Myocyte Cytoskeleton and Relation to Contractile Protein Synthesis and Function
F. G. Spinale and T. K. Borg

Wednesday, April 9, 2:00 PM

Lung Vascular Injury and Remodeling During Development
K. Stenmark and M. Rabinovitch

Metabolic Engineering: Regulated Gene Expression to Study Metabolic Regulation
M. Watford and F. Bosch

Mechanisms of Water Flow Across Biological Membranes
M. L. Zeidel and H. W. Harris, Jr.

Physiology InFocus
Cell Signaling: Multiple Pathways, Integration and Crosstalk

Organizer:
William W. Chin
Harvard Medical School

Sunday, April 6, 1997 (2:00 – 5:00 PM)
APS Past President's Symposium: Molecular Physiology of Obesity
Jeffrey M. Friedman
Rockefeller University
Leonard S. Jefferson
Pennsylvania State University, Hershey

Molecular Genetics of Obesity
Jeffrey Friedman, Rockefeller University
Transgenic Models of Obesity
Leslie Kozak, Jackson Laboratories, Bar Harbor, ME
C/EBP and the Adipocyte
Daniel Lane, Johns Hopkins School of Medicine
Neuropeptide Y Gene and Obesity in Transgenic Mice
Richard Palmiter, University of Washington School of Medicine
Melanocortinergic Signaling and the Agouti Obesity Syndrome
R. Cone, Oregon Health Sciences University

Monday, April 7, 1997 (8:30 – 11:30 AM)
Integration of Signal Transduction in Hormone Action Via Nuclear Receptors
Benita Katzenellenbogen
University of Illinois, Urbana

Estrogen Receptor Action: Regulation by Steroid Hormones, Second Messengers, and Growth Factors
Benita Katzenellenbogen, University of Illinois, Urbana
Estrogen Receptor-Growth Factor Interrelationships
Kenneth Korach, NIEHS, Research Triangle Park, NC
Ligand-Independent Activation of Nuclear Receptors and the Role of Coactivators
Bert O'Malley, Baylor College of Medicine
Integration of Nuclear Receptor Action Via Coactivators
M. Geoffrey Rosenfeld, University of California at San Diego

EB Special Session

Experimental Biology and NASA in the 21st Century
Daniel Goldin, NASA

MONDAY APRIL 7 12:45 PM
CONVENTION CENTER RM 64/65/66

Monday, April 7, 1997 (2:00 – 5:00 PM)
Growth Factors, Nuclear Receptors, and Crosstalk
C. Ronald Kahn
Joslin Diabetes Center, Harvard Medical School

JAK Kinase Signaling Pathways
Christin Carter-Su, University of Michigan School of Medicine
Crosstalk in the Retinoid Signaling Pathway
Hinrich Gronemeyer, Strasbourg, France
A Link Between G Protein-Coupled Receptors and Receptor and Nonreceptor Tyrosine Kinases
Robert Lefkowitz, Duke University
CBP: A General Cofactor for Signal-Dependent Activators
Mark Montminy, Joslin Diabetes Center, Harvard Medical School

Tuesday, April 8, 1997 (8:30 – 11:30 AM)
Nuclear Receptors, Crosstalk, and the Brain
Donald Pfaff
Rockefeller University

Thyroid Hormone Receptor Crosstalk With Estrogen Receptor in Sexual Behavior
Donald Pfaff, Rockefeller University
Progesterone Receptor in Normal Physiology: Lessons From a Gene Knockout
Orla Conneely, Baylor College of Medicine
Androgen/c-Fos Crosstalk in the Brain After Mating
Michael Baum, Boston University
Glucocorticoid and Mineralocorticoid Receptors in the Neurochemistry of Adaptation to Stress
Bruce McEwen, Rockefeller University

Wednesday, April 9, 1997 (8:30 – 11:30 AM)
Thyroid and Steroid Hormones in Nongenomic Action
Jack Leonard
University of Massachusetts School of Medicine

Direct Thyroid Hormone Action on the Cytoskeleton of Nerve Cells
Jack Leonard, University of Massachusetts School of Medicine
Nongenomic Actions of Progesterone in Human Sperm
Peter Blackmore, Eastern Virginia Medical School
Membrane-Initiated Actions of Estrogen
Cheryl Watson, University of Texas, Galveston
Aldosterone Action at the Plasma Membrane
Martin Wehling, University of Munich

Sections Special Functions

Cardiovascular
Steering Committee
Wednesday, April 9, 7:30 AM
Hilton Riverside, Chequers

Dinner
Tuesday, April 8, 6:30 PM
Hilton Riverside, Jasperwood

Cell and General Physiology
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Warwick

Banquet and Lecture
Monday, April 7, 6:30 PM
Hilton Riverside, Grand Salon

Central Nervous System
Steering Committee
Monday, April 7, 12:00 NOON
Hilton Riverside, Marlborough B

Reception
Tuesday, April 8, 6:30 PM
Hilton Riverside, Magnolia

Comparative Physiology
Steering Committee
Monday, April 7, 12:00 NOON
Hilton Riverside, Chequers

Business Meeting, Social, Scholander Awards
Tuesday, April 8, 6:30 PM
Convention Center, Room 9

Endocrinology and Metabolism
Steering Committee
Monday, April 7, 12:00 NOON
Hilton Riverside, Prince of Wales

Endo. and Metabolism Awards Reception
Monday, April 7, 6:30 PM
Hilton Riverside, Marlborough A

Environmental and Exercise Physiology
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Marlborough A

Dinner
Tuesday, April 8, 6:30 PM
Hilton Riverside, Belle Chasse

Gastrointestinal
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Marlborough B

Reception/Business Meeting
Tuesday, April 8, 6:45 PM
Hilton Riverside, Melrose

History of Physiology Group
Lecture on the Environment
Monday, April 7, 1:00 PM
Convention Center, Room 57

Neural Control and Autonomic Regulation
Reception
Monday, April 7, 6:30 PM
Hilton Riverside, Cambridge

Renal Physiology
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Oak Alley

Dinner
Tuesday, April 8, 7:00 PM
Bella Luna Restaurant, Terrace Room

Respiration
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Jasperwood

Business Meeting
Monday, April 7, 5:00 PM
Convention Center, Room 9

Reception
Tuesday, April 8, 6:30 PM
Hilton Riverside, Elmwood

Dinner
Tuesday, April 8, 7:30 PM
Hilton Riverside, Oak Alley

Teaching of Physiology
Steering Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Chequers

Business Meeting
Monday, April 7, 12:00 NOON
Convention Center, Belle Chasse

Arthur C. Guyton Teaching Award Presentation
Sunday, April 6, 6:30 PM
Hilton Riverside, Jasperwood

Dinner
Sunday, April 6, 8:00 PM
Restaurant Delmonico

Water and Electrolyte Homeostasis
Steering Committee
Tuesday, April 8, 7:30 AM
Hilton Riverside, Marlborough B

Luncheon and Business Meeting
Tuesday, April 8, 11:30 AM
The Plimsoll Club of New Orleans

Publications Special Functions

Journal Editorial Boards Group Meeting
Sunday, April 6, 3:00 PM
Convention Center, Room 2

AJP: Cell Physiology
Editor and Associate Editors
Tuesday, April 8, 7:30 AM
Hilton Riverside, Chequers

AJP: Lung Cellular and Molecular Physiology
Editor and Associate Editors
Tuesday, April 8, 12:00 NOON
Hilton Riverside, Cambridge

AJP: Renal, Fluid and Electrolyte Physiology
Editor and Associate Editors
Monday, April 7, 12:00 NOON
Hilton Riverside, Jasperwood

Journal of Applied Physiology
Editor and Associate Editors
Monday, April 7, 12:00 NOON
Hilton Riverside, Oak Alley

Handbook Committee
Tuesday, April 8, 12:00 NOON
Hilton Riverside, Chequers

History of Physiology Book Committee
Monday, April 7, 12:00 NOON
Hilton Riverside, Cambridge

Technical Series Book Committee
Monday, April 7, 7:30 AM
Hilton Riverside, Prince of Wales

Committee Meetings

Animal Care and Experimentation
Sunday, April 6, 8:00 AM
Hilton Riverside, Chequers

Career Opportunities
Monday, April 7, 7:30 AM
Hilton Riverside, Cambridge

Committee on Committees
Sunday, April 6, 8:00 AM
Hilton Riverside, Cambridge

Education
Tuesday, April 8, 7:30 AM
Hilton Riverside, Prince of Wales

International Physiology
Monday, April 7, 12:00 NOON
Hilton Riverside, Marlborough A

Liaison With Industry
Tuesday, April 8, 7:30 AM
Hilton Riverside, Oak Alley

Long-Range Planning
Tuesday, April 8, 12:00 NOON
Hilton Riverside, Marlborough B

Membership
Tuesday, April 8, 7:30 AM
Hilton Riverside, Marlborough A

Porter Physiology Development'
Tuesday, April 8, 12:00 NOON
Hilton Riverside, Marlborough A

Program
Tuesday, April 8, 12:00 NOON
Hilton Riverside, Prince of Wales

Program Advisory
Sunday, April 6, 8:00 AM
Hilton Riverside, Marlborough A

Wednesday, April 9, 12:00 NOON
Hilton Riverside, Marlborough A

Public Affairs
Monday, April 7, 4:30 PM
Hilton Riverside, Prince of Wales

Section Advisory
Saturday, April 5, 6:30 PM
Hilton Riverside, Marlborough A & B

Sunday, April 6, 8:00 AM
Hilton Riverside, Marlborough B

Women in Physiology
Wednesday, April 9, 7:00 AM
Hilton Riverside, Marlborough B

STOP BY BOOTHS 317 & 319 AT EB'97 FOR MORE CONFERENCE INFORMATION

AMERICAN PHYSIOLOGICAL SOCIETY

CONFERENCES

Experimental Biology '97

April 6-9, 1997 • New Orleans, LA

The Physiology and Functional Diversity of Amiloride-Sensitive Na^+ Channels: A New Gene Superfamily

October 29 - November 1,1997 • Park City, UT

Experimental Biology '98

April 18-22, 1998 • San Francisco, CA

Endothelial Regulation of Vascular Tone: Molecular to Integrative Physiology

September 16-19, 1998 • Augusta, GA

The Paraventricular Nucleus of the Hypothalamus: A Crossroads of Integrative Physiology

December 5-9, 1998 • San Antonio, TX

Please send me program and registration information for the following APS Conferences:

- ❑ ***Experimental Biology '97***
- ❑ ***The Physiology and Functional Diversity of Amiloride-Sensitive Na+ Channels: A New Gene Superfamily***
- ❑ ***Experimental Biology '98***
- ❑ ***Endothelial Regulation of Vascular Tone: Molecular to Integrative Physiology***
- ❑ ***The Paraventricular Nucleus of the Hypothalamus: A Crossroads of Integrative Physiology***

Name _____

Department _____

Institution _____

Address _____

City/State _____

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Country _____

Phone _____ **FAX** _____

E-mail _____

Mail to: *The APS Conference Office, The American Physiological Society, 9650 Rockville Pike, Bethesda, Maryland 20814-3991, USA*

Or fax your request to 301-571-8313.

1997 APS Conference

The Physiology and Functional Diversity of Amiloride-Sensitive Na^+ Channels: A New Gene Superfamily

October 29–November 1, 1997 • Park City, UT

ORGANIZERS:
Dale J. Benos
University of Alabama at Birmingham
Bernard C. Rossier
Universit de Lausanne

STEERING COMMITTEE:
Douglas C. Eaton
Emory University School of Medicine
Lawrence G. Palmer
Cornell University Medical College
Bruce Stanton
Dartmouth Medical School
David G. Warnock
Division of Nephrology-UAB

PROGRAM

WEDNESDAY, October 29, 1997

Welcome
Meeting Overview
Dale Benos, Birmingham, AL**,** and **Bernard Rossier,** Lausanne, Switzerland

Ion Channels: Evolution and History
Ramon Latorre, Santiago, Chile

The ENaC Family
Barbara Grubb, Chapel Hill, NC
Cecilia Canessa, New Haven, CT; **Laurent Schild**, Lausanne, Switzerland; **Peter Snyder**, Iowa City, IA; **Bernard Rossier**, Lausanne, Switzerland; **Edith Hummler**, Lausanne, Switzerland; **Richard Lifton**, New Haven, CT; **Catherine Fuller**, Birmingham, AL

THURSDAY, October 30, 1997

Na^+ Channels in the Kidney
James A. Schafer, Birmingham, AL
Larry Palmer, New York; **Brian Ling**, Atlanta, GA; **Nicolette Farman**, Paris, France; **Bruce Stanton**, Hanover, NH; **Matt Breyer**, Nashville, TN; **Steven Ernst**, Ann Arbor, MI

Regulation of Na^+ Channels
Dennis Ausiello, Boston, MA
Haim Garty, Rehovet, Israel; **Sarah Sariban Sohraby**, Brussels, Belgium; **Nick Johnson**, Pittsburgh, PA; **Horacio Cantiello**, Boston, MA; **Iskander Ismailov**, Birmingham, AL

FRIDAY, October 31, 1997

Socratic Debate: How Does cAMP Regulate Na^+ Channels?
Dennis Brown, Boston, MA
Francois Verrey, Zurich, Switzerland; **Peter Smith**, Philadelphia, PA

Socratic Debate: Are Amiloride-Sensitive Na^+ Channels in Nonepithelial Systems the Same as Those in Epithelia?
Mortimer Civan, Philadelphia, PA
James Bubien, Birmingham, AL; **Doug Eaton**, Atlanta, GA

Na^+ Channels in the Lung
Pierre Barker, Chapel Hill, NC
Pascal Barbry, Nice, France; **Hugh O'Brodovich**, Toronto, Canada; **Sadis Matalon**, Birmingham, AL; **Jackson Stutts**, Chapel Hill, NC; **Y. Berthiaume**, Montreal, Canada; **Colleen Talbott**, Chapel Hill, NC; **Sandra Guggino**, Baltimore, MD; **William Guggino**, Baltimore, MD

SATURDAY, November 1, 1997

Sensory Transduction and Amiloride-Sensitive Cation Channels
Bernd Lindemann, Homburg, Germany
Carole Hackney, Keele, UK; **Sue Kinnamon**, Ft Collins, CO

Mechanosensitive Ion Channels
Cathy Morris, Ottawa, Canada
Ching Kung, Madison, WI; **Martin Chalfie**, New York; **Monica Driscoll**, Piscataway, NJ; **Mouhamed Awayda**, New Orleans, LA; **Jean-Michel Achard**, Paris, France

Na^+ Channels and the Cytoskeleton
Fiona McDonald, Wellington, New Zealand
Adrianna Prat, Boston, MA; **Daniela Rotin**, Toronto, Canada

Clinical Relevance of Amiloride-Sensitive Na^+ Channels in Genetic Disease
Michael Welsh, Iowa City, IA
David Warnock, Birmingham, AL; **Ric Boucher**, Chapel Hill, NC

Structural Models of Amiloride-Sensitive Na^+ Channels
Mauricio Montal, San Diego, CA
Tom Kleyman, Philadelphia, PA; **Jean-Daniel Horisberger**, Lausanne, Switzerland; **Robert Guy**, Bethesda, MD

1998 APS Conference

Endothelial Regulation of Vascular Tone: Molecular to Integrative Physiology

September 16-19, 1998 • Augusta, Georgia

Radisson Riverfront Hotel

ORGANIZER:

David M. Pollock
Medical College of Georgia

STEERING COMMITTEE:

Jennifer S. Pollock
Medical College of Georgia

John D. Catravas
Medical College of Georgia

L. Gabriel Navar
Tulane University

Harris J. Granger
Texas A&M University

Subsequent to the realization that endothelial cells are important regulators of vascular, immunological, and probably many other functions, endothelial cell biology has rapidly expanded into a distinct discipline. Simply in terms of vascular function, this relatively new area covers an extremely wide range of the more traditional disciplines, including physiology, pharmacology, and cell and molecular biology. The purpose of this conference is to present the most recent information on the interaction among major endothelial factors in the control of the vascular tone.

The conference brings together rapidly growing areas of endothelial cell biology so as to develop a more cohesive picture of the vascular endothelium as a physiological organ system. While the primary emphasis will be on specific mediators, related subjects such as shear stress and vascular remodeling will also be covered. Molecular and whole animal physiologists will demonstrate how their methodologies integrate into a central hypothesis and also define the similar aspects and unique mechanisms that exist among the different vascular beds. The conference is different from other vascular related meetings in that it attempts to bring together diverging areas of endothelial cell biology to develop a more cohesive picture of vascular endothelial function.

Tentative Schedule

Wednesday, September 16

Discovery of EDRF
Salvador Moncada, University College, London

Signal Transduction and Gene Regulation
Robert Highsmith, University of Cincinnati; **Rudi Busse**, J.W. Goethe University, Germany; **Ferid Murad**, Molecular Geriatrics; **Brian Duling**, University of Virginia

Thursday, September 17

Paracrine Regulation of the Renal Circulation
L. Gabriel Navar, Tulane University

Endothelial Control of the Renal Microcirculation
Josephine P. Briggs, University of Michigan; **Christopher Wilcox**, Georgetown University; **William J. Arendshorst**, University of North Carolina

Interaction of Nitric Oxide With Other Mediators
David Pollock, Medical College of Georgia; **Pam Carmines**, University of Nebraska; **Tom Hintze**, New York Medical College

Regulation of NOS in Vascular Smooth Muscle
Jennifer Pollock, Medical College of Georgia

Oral Communications on Nitric Oxide

TGF in Fibrotic Disease
Wayne Border, University of Utah

Friday, September 18

Transgenic Mice as Models for Hypertension
Ed Shesley, Henry Ford Hospital

Endothelial Dysfunction: Pharmacology
Joan Kaiser, Parke-Davis; **Lou Ignarro**, University of California at Los Angeles; **Ulrich Förstermann**, Gütenberg University, Mainz, Germany

Endothelial Dysfunction: Pulmonary
Bruce Pitt, University of Pittsburgh; **John D. Catravas**, Medical College of Georgia; **Steve Abman**, University of Colorado

Endothelial Dysfunction: Cardiovascular
Richard Paul, University of Cincinnati; **Leslie Fuchs**, Medical College of Georgia; **Richard Cohen**, Boston University

Peptidase Activity in the Vascular Endothelium
Jim Ryan, Medical College of Georgia

Oral Communications on Endothelin, Renin-Angiotensin, Prostaglandins

Pivotal Role of Endothelium to Heart-Lung Transplantation
Sir Magdi Yacoub, Imperial College, London, UK

Saturday, September 19

Endothelial Regulation of Angiogenesis
Harris Granger, Texas A&M University

Vascular Remodeling
Mary Gerritsen, Bayer; **Gary Gibbons**, Stanford University; **David Harrison**, Emory University

Shear Stress
John Frangos, University of California at San Diego; **Robert Nerem**, Georgia Tech.; **Barbara Ballerman**, Johns Hopkins

Estrogen Modulation of the Vascular Endothelium: Implications for Development of Coronary Artery Disease
Virginia Miller, Mayo Clinic

Oral Communications on Growth Factors and Shear Stress

Endothelial Gene Transfer in Restenosis
Elizabeth Nabel, University of Michigan

1998 APS Conference

The Paraventricular Nucleus of the Hypothalamus: A Crossroads of Integrative Physiology

December 5–9, 1998

The Menger Hotel, San Antonio, Texas

ORGANIZER:

Joseph R. Haywood
University of Texas Health Sciences Center, San Antonio

STEERING COMMITTEE:

Alan K. Johnson
University of Iowa

Arthur D. Loewy
Washington University

Leo P. Renaud
University of Ottawa

Catherine Rivier
Salk Inst.

A. J. W. Scheurink
University of Groningen, The Netherlands

The paraventricular nucleus of the hypothalamus (PVN) serves as the crossroads of integrative physiology. This discrete hypothalamic area receives neural, humoral, and endocrine input regarding the state of the cardiovascular, endocrine, and immune systems, as well as fluid and electrolyte and energy balance. Integration of afferent inputs results in efferent neural or hormonal regulation of specific organ systems. This conference will bring together scientists who study different physiological systems and who use a variety of technical approaches ranging from molecular biology to whole animal physiology. The goal will be to understand how the PVN integrates afferent information, controls specific physiological functions, and coordinates interactions among organ systems.

Tentative Invited Sessions

Anatomy, Neural Pathways and Neurochemistry
Arthur Loewy, Washington University; **Paul Sawchenko**, Salk Institute; **Larry Swanson**, University of California at Los Angeles

Integration of Ingestive Behaviors
Alan Kim Johnson, University of Iowa; **Glenn Stanley**, University of California at Riverside; **Stephen Woods**. University of Washington; **Joseph Verbalis**, University of Virginia; **John Wright**, Washington State University

Role in Metabolism and Energy Balance
Anton J. W. Scheurink, University of Groningen, The Netherlands; **John Vissing**, University of Copenhagen, Denmark; **Barry Levin**, Veterans Affairs Medical Center., East Orange, New Jersey; **Gerjan van Dijk**, University of Washington, **Martine Orosco**, College of France

Neuroendocrine Regulation
Leo P. Renaud, University of Ottawa; **Stanley Watson**, University of Washington; **Ruud Buijs**, Netherlands Institute of Brain Research; **Charles Bourque**, Montreal General Hospital; **William Crowley**, University of Tennessee; **Paul Plotsky**, Emory University

Stress and the Immune System
Catherine Rivier, Salk Institute; **Serge Rivest**, Laval University; **Dwight Nance**, University of Manitoba; **Adrian Dunn**, Louisiana State University Medical Center; **James Herman**, University of Kentucky

Control of Cardiovascular-Renal Function
Joseph R. Haywood, University of Texas Health Sciences Center, San Antonio; **Steven Bealer**, University of Tennessee; **Quentin Pittman**, University of Calgary; **Marianna Morris**, Bowman Gray School of Medicine; **Kaushik Patel**, University of Nebraska; **Alistair Ferguson**, University of Ontario

APS Society Mixer

Sunday, April 6, 9:00 PM to 12 midnight
Dance to the sounds of "Lagniappe"
and enjoy sumptuous desserts
at the Hilton Riverside, Grand Ballroom A

Travel Grant Program Extended to March 1

The US National Committee for the International Union of Physiological Sciences is seeking applications for travel awards for the XXXIII IUPS Congress in St. Petersburg June 30-July 5, 1997. The deadline for the grant application has been extended to March 1, 1997.

The Committee will screen the applications, and the awards will be made by APS, which is raising funds for the travel. The travel awards will be approximately $800 to help cover the majority of the airfare to St. Petersburg.

Peter's Palace in Petrodvoretz.

Church of the Resurrection of Christ.

The awards are intended for individuals who have no other source of funds to attend the Congress. Federal employees are eligible. It is anticipated that more applications will be received than can be funded. To achieve as high a rank as possible, the following factors should be considered:

- Complete all questions on the application.
- Provide copies of letters of invitation if you have been invited to the Congress to make a presentation.
- Provide an indication of participation in the Congress, including presentations and attendance for most or all sessions.
- Have travel plans that include other professional visits or work.

The deadline for submissions of applications for travel awards is **March 1, 1997**. The application is on the following page. All applicants must submit **six** copies of the application to USNC/IUPS, National Academy of Sciences, Attn: Robin Schoen, 2101 Constitution Avenue NW, Washington, DC 20418. ❖

Jenonne Schafer
Mitchell/Fitzgerald & Associates, Inc.
Travel Management Firm
1730 K Street, NW, Suite 910
Washington, DC 20006

Yes, I want additional information about travel to the IUPS Congress and the pre- and post-Congress tours. Please contact me at:

Name:_____

Address:_____

_____

_____

Tel: _____ Fax: _____

Traveling to the IUPS Congress

Mitchell/Fitzgerald Travel has been selected as the official travel agency for the 1997 IUPS Congress in St. Petersburg, Russia. Mitchell/Fitzgerald Travel will provide discounted airfares to St. Petersburg to all participants in the Congress on either Delta Airlines or Finnair. In addition, Mitchell/Fitzgerald Travel will be offering a pre-Congress tour of the Russian countryside and a post-Congress tour of Scandanavia. Both tours will last approximately one week. For additional information, contact **Jenonne Schafer, Mitchell/Fitzgerald & Associates, Inc. Travel Management Firm, 1730 K Street, NW, Suite 910, Washington, DC 20006. Tel: 1-800-228-0861 or 1-202-331-3322.**

Extended

Surname _____

XXXIII IUPS Congress Travel Grant Program
St.Petersburg, Russia
June 30-July 5, 1997

Please mail **six** copies of this application to:

USNC/IUPS
National Academy of Sciences
ATTN: Robin Schoen
2101 Constitution Avenue, NW
Washington, DC 20418

Deadline: March 1, 1997

1. Name and Degree: Year of highest degree:
2. Faculty position or employment title: Year of Birth:
3. Address:

4. Phone Number: Fax Number:
5. E-mail Address:
6. Country of citizenship: Visa status if not US citizen:
7. Underrepresented Minority Applicants: Please circle ethnic group to which you belong:
   African American Hispanic Native American Pacific Islander

8a. Gender: Male Female 8b. Do you need special assistance or accommodations?

9. Attending entire Congress? Yes No If not, which days will you attend?
   Will you present an invited paper or poster at the Congress? Yes No
   If so, please indicate the sessions you will address. If invited, attach letter of invitation.
   Invited to give public lecture (give title):

   Invited to Congress symposium (give title; indicate chairman):

10. Do you intend to submit a poster? (If yes, please give title):

11. Please describe your area of specialty (e.g. cell physiology, cardiovascular physiology, neurophysiology, etc.):

12. Member of: APS SGP Div .Comp. Physiol. & Biochem., ASZ Soc. Neurosci.
    BMES Microcirc. Soc. Other

13. Are you employed by the federal government more than half-time? Yes No

14. Travel: a. City of departure b. Support requested
    c. Amount of other support available (excluding personal)

15. Recent publications (not more than 5 titles, giving full refs). If listing abstracts or manuscripts in press, please indicate.

Surname _____

16. Anticipated abstract (Not more than 250 words on paper or poster you plan to present at the Congress, including names of author and coauthors and indicate presenter. If none, abstract of current work.)

17. Give a brief resume of the scientific purposes and goals of your trip in addition to attending the Congress, including other meetings, satellite symposia, laboratories you plan to visit, work on collaborations, etc.

Budget Cycle Launched with Senators Urging NIH Increase

The 105th Congress got off to a quick start in support of research. During the opening days of the legislative session, Republican senators sponsored a bill and a resolution supporting increased funding for research in general and at NIH in particular.

On January 21, Sen. Phil Gramm (R-TX) introduced the National Research Investment Act of 1997. Cosponsored by Senators Connie Mack (R-FL) and Kay Bailey Hutchison (R-TX), S. 124 would authorize a doubling of federal investment in basic science and medical research over the next 10 years. The bill provides language authorizing annual funding increases for research and development at various federal agencies, including NIH, NSF, NASA, VA, and CDC.

However, authorization is only one part of the budget battle. Agency spending is authorized by one set of congressional committees that conduct oversight of their activies. Even when new funding has been authorized, the funds themselves still have to be approved each year by the Appropriations Committees, which may have a different agenda.

Also on January 21, a group of Republican senators headed by Sen. Mack introduced a "sense of the Senate" resolution calling for the doubling of the NIH budget over the next five years. Senator Gramm cosponsored S. 15, as did Senators Arlen Specter (R-PA), Bill Frist (R-TN), and Alfonse D'Amato (R-NY).

In introducing the nonbinding resolution, Sen. Mack recalled a moving congressional hearing last fall chaired by retiring Sen. Mark Hatfield (R-OR). At that hearing, a number of individuals came forward to discuss how serious illness had affected them and to urge increased funding for biomedical research. "Yes, I am talking about spending more money," Sen. Mack stated, "but it is an area in which I believe the Federal government should be more active, and I believe it is an area where we will get a major return for it."

Sen. Specter, who chairs the Senate Appropriations Subcommittee on Labor-HHS-Education, indicated in a statement on the Senate floor January 22 that he was "prepared to commit to an increase in the next year's [NIH] budget of 7.5%, which would amount to some $950 million."

"I want to emphasize how difficult it will be to reach $950 million and a 7.5% commitment," Specter said, urging his fellow senators to consider "alternative methods of financing" biomedical research other than the regular appropriations process.

Yes, I am talking about spending more money, but (biomedical research) is an area in which I believe the Federal government should be more active.

Sen. Connie Mack (R-FL)

Last year Congress provided NIH with a 6.9% overall increase including a 6.5% increase for research activities. Sen. Specter and House Appropriations Subcommittee Chairman John Porter (R-IL) were active in securing that increase.

Meanwhile, President Clinton's budget proposals for FY 1998 are expected to be submitted to Congress on February 6. Although the budget numbers are kept under wraps prior to their official release, it is generally expected that NIH will be given a small increase, possibly 3% or less.

When the President sends his budget to Capitol Hill, it is dealt with in two different ways more or less simultaneously. The House and Senate Budget Committees, which are charged with crafting a broad outline for taxes and spending, look at the budget as a whole. They determine how much the federal government can expect to collect in taxes and how much it should spend for program categories such as "national defense," "international relations," and "health." The latter category includes entitlement programs such as Medicare and Medicaid, as well as discretionary programs such as NIH health research. The Budget Committees hold hearings where administration officials provide an overview of the budget and prospects for the economy.

At the same time that the two Budget Committees are holding hearings and starting to draft the budget resolution, the House and Senate Appropriations Subcommittees also hold hearings on the federal agencies under their jurisdiction. For example, the Labor-HHS-Education Subcommittee, which has jurisdiction over NIH, holds hearings where Secretaries of those departments are asked to discuss and defend the programs and priorities of the President's budget. Other officials — such as the director of NIH and the directors of the individual institutes, centers, and divisions — then make more specific presentations on the programs. Members of the public with an interest in the programs can also offer testimony.

There is a statutory timetable for the Budget Committees to produce a budget resolution, although Congress doesn't always meet its own deadlines. The resolution does not have the force of law, but Congress uses it as a guideline for the subsequent appropriations bills.

By late spring, Congress adopts the final, compromise budget resolution, after which the House and Senate Appropriations Committees divide up "budget authority" and "outlays" among the 13 subcommittees that actually write the appropriations bills. Budget authority means authority for a government agency to agree to spend money; while outlays mean actually spending it. NIH, for example, has a "high outlay rate" because so many of its activities involve grants. Appropriations Committees are not strictly bound to divide the money according to the guidance provided by the Budget Committees, but they must conform to the bottom line: the total budget approved. ❖

Appeals Court Rules NAS Committees Must Open Deliberations

On January 10, a three-judge panel of the US Circuit Court of Appeals for the District of Columbia ruled that expert committees convened by the National Academy of Sciences (NAS) must open up their deliberations to public scrutiny. The case involved a suit by animal rights groups seeking access to the proceedings of the panel appointed by the Institute of Laboratory Animal Resources (ILAR) to revise NIH's *Guide for the Care and Use of Laboratory Animals*. The decision could have a profound impact on all future NAS studies, but it is not yet known whether the government or NAS will take this ruling to the Supreme Court on appeal.

The suit was brought in May, 1994, by the Animal Legal Defense Fund (ALDF), Psychologists for the Ethical Treatment of Animals, and the Association of Veterinarians for Animal Rights against the Department of Health and Human Services, the Public Health Service, and NIH. NAS itself subsequently joined the government as a codefendant. In the suit, ALDF charged that committees organized by NAS ought to be subject to the rules of the Federal Advisory Committees Act (FACA), which requires open meetings and public access to documents. The suit requested that animal rights organizations be given access to the deliberations of the Committee to Revise the *Guide* and that persons holding their views be appointed to the committee.

The plaintiffs' request was initially rejected by the US District Court, and their appeal of that request was dismissed because the *Guide* committee had already completed its work before the case could be heard. The lower court also ruled that the Committee to Revise the *Guide* did not fit the definition of an "advisory committee" subject to FACA because it was not "established or utilized by one or more [Federal] agencies." The appeals court judges overturned the earlier ruling because they concluded that NAS committees do fit the description given in the 1972 law, which says that advisory committees are "established or utilized by one or more agencies" of the Federal government "in the interest of obtaining advice or recommendations."

The appeals court relied upon an earlier case (*Public Citizen v. US Dept. of Justice*) in which the Supreme Court sought to define what kinds of non-government advisory panels ought to fall under FACA. The Supreme Court cited NAS committees as a "paradigmatic example" of private groups that are used in the same way as government advisory panels, especially because NAS itself is a "quasi-public organization in receipt of federal funds."

The Court of Appeals said that it had no choice but to follow the Supreme Court's reasoning regarding NAS committees, despite the fact that the legislative history of FACA itself included a brief colloquy on the House floor in which two Members of Congress clarified that the bill was not intended to apply to advisory panels convened by the National Academy of Sciences.

The seventh edition of the *Guide for the Care and Use of Laboratory Animals* was published in August 1996, but the appeals court sent the case back to the lower court to determine whether the ALDF and the other groups should now be given access to documents or whether "other injunctive relief should issue." ❖

Lab Animal Usage Continues to Drop

The most recent figures reported to the USDA show that the numbers of laboratory animals used in US research continue to decline. The Animal Welfare Act (AWA) requires research facilities to report annually on the numbers of animals belonging to each regulated species used in research.

These figures provide only a partial picture since the AWA regulations do not cover all species. The non-covered species include rats and mice bred for laboratory use, which are estimated to comprise 90% or more of research animals.

According to the USDA figures, the number of lab animals reported by US research institutions rose somewhat between 1975 and 1985 and since then have fallen off significantly. For example, 154,489 dogs were reported in 1975, 194,905 in 1985, and 89,420 in 1995. The numbers of cats rose similarly from 51,439 in 1975 to 59,211 in 1985 and dropped to 29,569 in 1995.

The only species still being used in numbers comparable to ten years ago are primates, which continue to be important to AIDS research. Primate use went from 36,202 in 1975 to 57,271 in 1985 and declined only slightly to 50,206 in 1995. ❖

NIH Explores Bridge Funding Options

NIH held a workshop December 4 to discuss interim funding of grant renewal applications. The House Appropriations Committee had asked NIH in the report that accompanied its FY 1997 funding bill to convene a workshop to discuss strategies to provide so-called "bridge funding" for highly rated research projects that do not receive funding. The panel asked NIH to submit a report on the workshop's findings by January 1, 1997.

Several institutes have developed approaches toward this problem, which involves a trade-off between the number of grants that can be fully funded and the disruption to ongoing meritorious research that suffers funding lapses. The House report asked NIH to look at ways to expand bridge funding programs NIH-wide. The FASEB consensus conference on FY 1998 funding for federal agencies also endorsed bridge funding for all NIH institutes.

At the December workshop, NIH Deputy Director for Extramural Research Wendy Baldwin gave a sense of the size of the problem. She reported that in FY 1996, 2,352 or 44.8 percent of R01 competitive renewal grant applications were ultimately funded. Of those nearly 2,400 grants, half or 1,167 grants, were renewed on time with no funding lapse. However, 14 percent (332 grants) had a one month funding lapse, 18 percent (430 grants) were left unfunded for two to six months, and another 18 percent (423 grants) had a funding lapse that lasted more than six months.

Many researchers have complained of the disruptions funding lapses can cause. Ongoing research may have to be halted. If the lapse persists for several months, highly trained staff members may leave, which means that new staff have to be hired and trained when the project resumes.

The National Institutes of General Medical Sciences (NIGMS) plans to implement an interim funding program for competitive renewals that fall within about 10 percentile points of the NIGMS payline. Eligible applicants will be provided with about a third of the grant's direct costs for a maximum of 12 months or until the grant is renewed. However, NIGMS has proposed to pay the grant's facilities and administrative costs (formerly known as indirect costs) at a rate of only 25 percent, which has been a source of controversy. NIGMS estimates that under this program it will be able to fund an additional 50-70 grants at an estimated cost of $3.5 million in FY 1997.

Other institutes have addressed the problem in different ways. The National Heart, Lung, and Blood Institute (NHLBI) prefers to provide full funding for all awards it makes. However, NHLBI sets aside 15 percent of its grant funding pool to selectively award to grants with high merit scores that fall beyond the payline for the remaining 85 percent of its extramural grant budget.

The National Institute of Allergy and Infectious Disease (NIAID) currently has a bridge funding program intended both to prevent serious disruption of ongoing productive research and to provide support for the gathering of additional preliminary data. NIAID also plans to use a "select pay" mechanism in FY 1997, with its advisory council making the awards throughout the year.

The National Cancer Institute (NCI) has an Accelerated Executive Review (AER) process conducted by the 22-member NCI executive committee. AER uses funds allocated to the NCI exceptions review pool (about $23 million in FY 1996). This pool is used both for interim funding and to fund selectively applications that fall just below the payline. It is used to fund projects with high levels of scientific merit, rather than those with high program relevance. To be eligible, a basic research project must fall within 4 percentile points of the payline, while patient-oriented research projects must fall within 10 percentile points. Eligible applicants receive a notice along with the summary statement for their application. The applicant must then submit a response to the program staff for review in order to be considered by the NCI executive committee at its monthly meetings.

At the workshop, Robert Rich, Vice President and Dean of Research at Baylor College of medicine argued in favor of a uniform, NIH-wide mechanism for bridge funding. Rich complained that multiple, institute-specific plans will be confusing to both applicants and grantee institutions. ❖

Stipend Increases Announced for Trainees and Fellows

For the first time since 1994, the National Institutes of Health, the Agency for Health Care Policy and Research, and the Health Resources and Services Administration have increased stipends for trainees and fellows participating in National Research Service Award (NRSA) training programs.

Not all trainees and fellows, however, will be eligible for the increased stipends, which were announced in the November 29th *NIH Guide for Grants and Contracts*. Only undergraduates, predoctorates, and postdoctorates in their first two years of training will receive the stipend increases, and the new stipend levels apply only to awards made beginning October 1, 1996.

The new payment schedule will boost stipends for predoctoral students nearly 15 percent from $10,008 to $11,496 and stipends for those in their first and second years of postdoctoral training about 3.5 percent to $20,292 and $21,420, respectively. Stipends for postdoctoral fellows beyond their first two years of training have remained unchanged since 1991. ❖

Richey Orders New Primate Regulations

On October 30, US District Court Judge Charles R. Richey issued a decision invalidating the section of the USDA Animal Welfare Act (AWA) regulations intended to assure the psychological well-being of nonhuman primates.

Section 3.81 of the AWA regulations requires research facilities, dealers, and exhibitors to develop, document, and adhere to a plan to provide a physical environment sufficient to assure primates' psychological well-being. Last March, the Animal Legal Defense Fund (ALDF) and four individuals filed suit against the USDA charging that Section 3.81 fails to fulfill the intent of Congress.

Judge Richey concurred with the ALDF's arguments and ordered the USDA to publish "new regulations that establish standards including minimum requirements for a physical environment adequate to promote the psychological well-being of primates, in accordance with the Animal Welfare Act and the Administrative Procedures Act (APA)." The Animal Welfare Act is the law that governs standards of humane care for laboratory animals, and the Administrative Procedures Act is the law that establishes the procedures government agencies must follow when they formulate regulations to carry out laws.

In recent years, Judge Richey issued two other rulings that would have revamped various aspects of the existing regulatory structure. However, those rulings were overturned by the Court of Appeals on the grounds that the plaintiffs had no legal standing to sue. Standing refers to whether an individual or organization has the right to appear in court. In the suit filed last March, ALDF provided new arguments as to why it and the four individuals should be granted standing.

Standing is very specific legal issue. When a challenge is made to federal statutes such as the AWA, a plaintiff must establish three conditions in order to be granted standing. First, the plaintiff must prove that when Congress wrote the law, it meant to provide some protection or benefit to the kind of individual or organization the plaintiff represents. The plaintiff must also show that he or she suffered some injury that was caused by government action or inaction. Finally, the plaintiff must show that the injury can be redressed through the action being sought in the suit.

In the primate welfare suit, the four individual plaintiffs argued that the public has a stake in AWA enforcement because the law is intended to ensure humane conditions for primates on public display. They argued that they had suffered "extreme aesthetic injury and psychological harm" from viewing primates in exhibition facilities in what were allegedly inhumane conditions. (Aesthetic injury is a legal concept utilized in certain areas of law, such as environmental protection.)

The ALDF itself was granted legal standing because Judge Richey decided that the fact that the organization devotes its resources to trying to influence the laws regarding the humane treatment of animals and ensuring compliance with those laws entitles it to contest USDA regulatory actions.

Having granted the plaintiffs standing, Judge Richey went on to rule in their favor on four of five charges that USDA violated the Administrative Procedures Act (APA) when it approved the regulations concerning the psychological well-being of primates.

Judge Richey ruled that Section 3.81 of the AWA regulations violates the APA because it does not establish minimum requirements for a physical environment to promote the psychological well-being of primates, which he considers to be a violation of the "plain language" of the statute. He ruled that the agency's failure to set these minimum standards amounts to an "unreasonable delay" in issuing regulations, which also violates the APA. Thirdly, he found that it was "arbitrary, capricious and an abuse of discretion" that USDA has not issued a regulation to promote actively the social housing of nonhuman primates. He also ruled that it was a violation of the procedural requirements of the APA that USDA decided to adopt as part of its final regulation a suggestion that had been submitted as a public comment without republishing the change as a new draft regulation.

The provision in question was the requirement that plans for primate enrichment should be held at the research or exhibition facility, rather than being placed on file at the USDA. ALDF contends that it never had the chance to comment on this provision, which prevents it from using the Freedom of Information Act to obtain primate enrichment plans since they are held at private facilities rather than at a government agency.

Judge Richey ruled against the plaintiffs on the fifth count, which called for a judicial inquiry to investigate USDA's alleged "abdication of its statutory responsibilities to enforce the AWA." Judge Richey dismissed this charge because the APA leaves such matters to agency discretion.

On December 10, the National Association for Biomedical Research (NABR) filed a petition to intervene in the suit as a codefendant in order to represent the interests of the research community since it will be directly affected by the outcome of this case. It is expected that the issue of legal standing will figure prominently in the appeal.

It is not known at this time whether the government itself will seek to appeal this decision. However, unless it is successfully challenged, this ruling will undermine the performance standards approach to animal welfare as embodied in the current AWA regulations.

According to the *Guide for the Care and Use of Laboratory Animals*, performance standards "define an outcome in

(continued on page 29)

Clinical Research Panel Reports

A special panel appointed by NIH Director Harold Varmus to investigate the state of clinical research gave its preliminary report at the December meeting of the Advisory Committee to the NIH Director. The panel's report emphasized "the need for improved training and support mechanisms and career advancement opportunities for clnical investigators and physician scientists" as well as the need to form partnerships with those who have a stake in clinical research, including the pharmaceutical industry, health insurance providers and managed care organizations, foundations, and academic health centers.

The Director's Panel on Clinical Research (CRP) was appointed in spring of 1995. Its 14 members are physicians from academia, government, and industry, chaired by David G. Nathan, President of the Dana-Farber Cancer Institute. The CRP was asked "to review the status of clinical research in the United States" and to recommend how to ensure its "effective continuance." The panel sought to find answers to important questions such as: Who is going to do clinical research? How are these individuals to be properly trained? Where will clinical research be conducted? How will clinical research be funded?

(continued from page 28)

detail and provide criteria for assessing that outcome, but do not limit the methods by which to achieve that outcome." Engineering standards, on the other hand, set requirements but do not specify a goal or outcome, nor, according to the *Guide*, do they provide for "interpretation or modification in the event that acceptable alternative methods are available or unusual circumstances arise." The biomedical research community supports the use of performance standards as the best way to assure the welfare of laboratory animals because they allow for flexibility and the use of professional judgment by animal care experts. ❖

The panel began by identifying some of the particular problems and challenges of clinical research. These included the competition for funding between basic and clinical research at a time of overall reductions in the federal budget and the perception that clinical researchers do not fare as well as basic researchers in the NIH grants process. Another challenge is the particular difficulty that teaching hospitals and medical schools face in supporting clinical research and training while clinical revenues are shrinking due to the influence of managed care and changes in federal Medicare and Medicaid.

The CRP also tried to define clinical research and to determine how much clinical research NIH funds, since that issue has been a source of strong concern. Previous estimates of the portion of clinical research in NIH's extramural grants portfolio have been as low as 10 percent.

A subcommittee charged with defining clinical research identified three broad categories. It found that first of all, clinical research consists of patient-oriented research conducted with human subjects or material of human origin (e.g., tissues, specimens, or cognitive phenomena) obtained by a member of the research team through direct interaction with human subjects. Such patient-oriented research includes development of new technologies, investigating the mechanisms of human disease, developing therapeutic interventions, and conducting clinical trials. The other broad categories of clinical research are epidemiologic and behavioral studies and outcomes research and health services research. This definition deliberately excludes *in vitro* studies that utilize human tissues without any direct patient contact. The panel also decided that mixed grant applications which include elements with both animal and human models were considered as clinical research.

Using this definition, the CRP determined that more than 30 percent of the extramural budget for new and competing grants in FY 1996 was devoted to clinical research. The panel also found that NIH is not the predominant funding source for clinical research. The funding sources include other federal agencies, academic institutions, philanthropic organizations, and the pharmaceutical industry, which funds more clinical research than any other sector.

The CRP issued a number of recommendations, including that NIH should improve the quality of training grants for clinical researchers by requiring formal training experiences and careful mentoring. It recommended initiating new funding support mechanisms for young and midcareer clinical investigators and the establishment of a medical student training program in clinical research on the NIH campus and in academic health centers. In both instances, it was suggested that NIH seek private sector collaboration if possible. It also recommended that extramural grant applications to support clinical research should be sent to study sections that review "an appreciable number" of such applications and whose members include experienced clinical investigators.

Recognizing that NIH is only one of many important players, the panel further recommended that NIH continue a "productive dialogue on sustaining clinical research with its partners, the academic health centers, the foundations, and the pharmaceutical and managed care industries." Members of the CRP played an active role in initiating that dialogue by holding meetings with representatives of those sectors.

The CRP summarized its recommendations as "key steps to strengthen clinical research without impeding the NIH's outstanding support of basic investigation" and called for "preserving the current balance between clinical and basic research funding within the NIH portfolio." ❖

NASA Investigates Bion Monkey Death

NASA plans to investigate why a rhesus monkey involved in the Bion project died after postflight surgery to collect bone and muscle tissue samples.

Ronald Merrell, who headed a Bion task force appointed by NASA earlier this year, has been asked to determine how to conduct the investigation. Merrell is chairman of the Department of Surgery at Yale University Medical Center. Earlier this year, Merrell's task force examined the scientific merit of the proposed research and whether rhesus monkeys were an appropriate choice for the studies. The Russian Space Agency will also conduct an investigation, according to NASA spokesman Michael Braukus.

On December 24, two specially trained rhesus monkeys were launched into space aboard a Russian satellite. The satellite and the monkeys were Russian-owned, but the US contributed about half of the $30 million flight costs. The Bion-11 mission, which was designed to study the effects of space flight on various living organisms, also included bugs, snails, flies, and plants. The monkeys, known as Lapik and Multik, were part of a series of Russian-US-French research projects to study how weightlessness affects the structure of bones, muscles and nerves, circadian rhythms, and fluid and electolyte balance. During the flight, data readings were taken while the monkeys performed certain tasks.

The Bion satellite was recovered two weeks later on January 7 near the city of Kustanay, Kazahkstan. The monkeys were "alert, active, and knew the people who were there to greet them," according to NASA Chief Veterinary Officer Joe Bielitzki, who observed the landing.

The monkeys were then taken to the Institute of Biomedical Problems in Moscow. There they went through some postflight testing to measure the effects of spaceflight in the absence of the special exercise regimens astronauts practice to counteract the effects of prolonged weightlessness. The next day, the animals underwent surgery to collect bone and muscle samples. According to news reports, Multik's heart stopped beating after the surgery, and the Russian, U.S., and French veterinary team was unable to revive him. The other monkey, Lapik, recovered without complications

Joan Vernikos, director of the life sciences division in NASA's Office of Life and Microgravity Sciences and Applications said that the tissue samples had been removed before Multik died. The animals were to have been tested again after about a month to measure their further recovery from weightlessness. Lapik is expected to remain at the institute for those studies, after which the surgically implanted measuring devices will be removed. He is then expected to be retired to the Russian primate center at Sochi/Adler.

Additional data from identical set of flight experiments is expected to be obtained from two more monkeys, who are scheduled to be flown aboard the Bion-12 mission in 1998. ❖

NIH Genome Center Becomes an Institute

Department of Health and Human Services Secretary Donna E. Shalala signed documents in January giving the National Center for Human Genome Research (NCHGR) a new name and new status among the other research institutes at NIH.

The new name, the National Human Genome Research Institute (NHGRI), more accurately reflects the growth and accomplishments of the former NCHGR, which was established seven years ago to carry out the NIH role in the Human Genome Project. The Division of Intramural Research within NCHGR provides an intellectual and technological focus for human molecular genetics research at NIH and leads the research community in applying genome approaches to understanding human genetic disease and developing new therapies. NCHGR has also played a prominent role in stimulating policy development on the ethical, legal, and social implications of human genetics research.

With its successful leadership of the Human Genome Project, its dynamic intramural laboratories, and active policy programs, NCHGR grew in function, responsibility, and structure to resemble formally designated NIH institutes. As an institute, NHGRI can more appropriately interact with other Federal agencies and develop collaborations with industry, academia, and international organizations in the fields of genome research and medical genetics. Institute status gives the NHGRI director equal standing with other institute directors at NIH and facilitates collaboration with other institutes. In addition, the new institute will operate under the same legislative authorities as other NIH research institutes. ❖

Questionable Finances Among Animal Advocates

The publication *Animal People* presented information on budgets, programs, and overhead of some 90 animal-related charities, including advocacy organizations, local humane societies, and shelters in its December 1996 issue. Information was also provided for ten "opposition" organizations, including the National Association for Biomedical Research, Foundation for Biomedical Research, and Americans for Medical Progress.

Animal People annually collects information about budgets and the allocation of fundraising expenses by organizations active in the fields of animal rights and animal welfare. The information is compiled primarily from current Internal Revenue Service Form 990 filings, which nonprofit organizations are required to make public. *Animal People* also calculates the percentages of budget allocated for programs and fundraising according to the guidelines set down by the National Charities Information Bureau (NCIB), which requires approved charities to spend at least 60% of their budgets on programs, excluding direct mail costs associated with fundraising.

According to the information presented, several of the most prominent animal activist organizations fail to meet NCIB standards for the operation of nonprofit charities. A selection of budgets and accompanying footnotes is presented in Table 1. ❖

Table 1. Budgets for Select Animal Welfare Organizations

Organization	1996 Budget
Humane Society of the US	$31,697,292
The Council of Better Business Bureaus' Philanthropic Advisory Service (PAS) evaluates charities' operations using less strict standards than the NCIB. According to Animal People, the PAS reported in April 1996 that in its opinion, the 1995 audited financial statements of the **HSUS** "understated its fundraising and membership development expenses and overstated its program service expenses."	
People for the Ethical Treatment of Animals	$13,438,018
According to Animal People, the Council of Better Business Bureaus' Philanthropic Advisory Service (PAS) advised in March that **PETA** fails to meet standards for truthful and accurate solicitations. The PAS has long been critical of PETA's three or four member board, which includes two full-time PETA employees, cofounders Ingrid Newkirk and Alex Pacheco.	
Friends of Animals	$4,407,026
Fund for Animals	$3,390,075
Doris Day Animal League	$1,841,021
The **Doris Day Animal League** spends a high percentage of its income — 72% — on fundraising and overhead using calcuation rules of the NCIB.	
National Anti-Vivsection Society	$1,604,619
Animal Legal Defense Fund	$1,315,347
In Defense of Animals	$1,378,453
Physicians Committee for Responsible Medicine	$1,377,960
New England Anti-Vivisection Society	$1,198,712
American Anti-Vivsection Society	$1,045,055
Some organizations did not respond to requests from Animal People to provide their IRS form 990. These include Animal Rights Network/*Animals Agenda*, National Alliance for Animals, and SUPRESS (Students United to Protest Research Experiments on Sentinent Subjects). Another prominent organization, the the Animal Welfare Institute reported that it had not yet filed its IRS Form 990.	

Name Change Signals New Era for AAALAC

The American Association for Accreditation of Laboratory Animal Care (AAALAC) has changed its name to the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International). The new name reflects the growing number of institutions outside the US seeking AAALAC International accreditation on their animal care and use programs.

Established in 1965, AAALAC International is a voluntary accreditation organization that enhances the quality of research, teaching, and testing by promoting humane, responsible animal care and use. Institutions seeking accreditation receive independent, expert assessments of their animal programs. Those that meet or exceed applicable standards are awarded AAALAC International accreditation. Attaining and maintaining accreditation demonstrates a commitment to the responsible and humane treatment of animals.

Information on AAALAC International's accreditation program is available on the Web at **http://www.aaalac.org** or by calling 800-926-0066. ❖

NSF Proposes New Merit Review Criteria

The National Science Foundation (NSF) has proposed condensing its existing four merit review criteria into two new criteria and asked the scientific community for comments on the proposed change.

In 1995, the National Science Board (NSF's governing body) established a Task Force on Merit Review to reexamine the criteria by which NSF evaluates research proposals. The current criteria have been in place since 1981. The Board charged the task force to revise NSF's criteria to mesh more closely with NSF's 1994 strategic plan.

The four existing NSF review criteria are research performer competence, intrinsic merit of the research, utility or relevance of the research, and effect of the research on the infrastructure of science and engineering. The two proposed criteria take the form of questions: "What is the intellectual merit and quality of the proposed activity?" and "What are the broader impacts of the proposed activity?"

Under the heading of intellectual merit and quality, reviewers will be asked to consider the likelihood that the project will significantly advance the knowledge base within and/or across different fields, whether the proposed activity suggests and explores new lines of inquiry, and to what degree the proposer's documented expertise and record of achievement increase the probability of success. They will also be asked to consider whether the project is conceptually well designed, whether the plan for organizing and managing the project is credible and well conceived, and whether there will be sufficient access to resources.

Under the question of broader impacts, reviewers will be asked to consider how well the proposed activity would advance discovery and understanding while concurrently promoting teaching, training, and learning and whether it will create or enhance facilities, instrumentation, information bases, networks, partnerships, and/or other infrastructure. Reviewers will also be asked to consider how well the activity broadens the diversity of participants, whether it enhances scientific and technological literacy, and what is its potential impact on meeting societal needs.

In discussing the proposal at a public meeting in December, NSF Director Neal Lane said there was nothing in the current criteria that was broken and needed fixing. Nor does NSF anticipate changing its portfolio, the flexibility it gives its program officers, or its approach to risk-taking. Quality will continue to be the threshold criterion but will no longer be sufficient reason to make an award.

According to the Task Force on Merit Review, the reasons for revising the current criteria included concerns that the existing criteria lack clarity. In some cases, this has encouraged the use of "unwritten" criteria, while in others it has led to less than uniform application of the criteria.

Furthermore, the current criteria do not easily encompass nonresearch activities such as education and human resources, facilities, and centers, nor do they track well with long-range goals and core strategies established for NSF in its 1994 strategic plan such as the integration of research and education.

The Task Force on Merit Review believes that the proposed criteria will be more clear to those who evaluate research as well as to those who propose it and that the explicit mention of intellectual quality and the broader impact of research will encourage the science and engineering community to address both issues in their proposals. The task force also believes that the new criteria will bring NSF's research portfolio more closely into line with its strategic goals.

The NSF asked that feedback on the proposed changes be submitted by January 31, 1997. This spring, the task force will forward its final recommendations to the National Science Board. ❖

AWIC Introduces *CARE CD*

The Animal Welfare Information Center (AWIC) proudly introduces *CARE CD* (Compendium of Animal REsources) — a unique CD-ROM developed by the US Department of Agriculture and the US Department of Health and Human Services in conjunction with other agencies that is designed to provide quick and easy access to more than 160 documents relating to animal care and use.

Prepared primarily for the biomedical research community, veterinarians, animal care regulators, and Institutional Animal Care and Use Committee members, *CARE CD* contains Federal legislation and regulations, policies and guidelines of professional societies, bibliographies, and full text articles and monographs. It is particularly useful in education and research settings.

The disk is current through July 1996. Many of the documents are difficult to locate in hard copy or appear on this disk with special permission from the authors and publishers.

For further information, contact: Michael Kreger, Animal Welfare Information Center. Tel: 301-504-6212; fax: 301-504-7125; e-mail: mkreger@nal.usda.gov.

Teacher Outreach Workshops Held

Nearly 200 teachers participated in training workshops held by the nine Local Outreach Teams (LOTs). The workshops, held from October to December 1996, incorporated activities from the Neural Networks and Physiology of Fitness workshop modules. The modules were developed by APS member researchers, science teachers, and science educators in San Diego, CA, and Columbus, OH.

Middle school teachers participated in hands-on activities from the Neural Networks module delivered by the LOTs in Vermillion, SD, Boston, MA, Greenville, NC, and Houston, TX. High school teachers in Davis, CA, Milwaukee, WI, Valhalla, NY, Dallas, TX, and San Antonio, TX, took part in hands-on activities from the Physiology of Fitness module.

Follow-up activities, including exploring the Internet for science resources and discussing how to implement the activities in their classrooms, are scheduled from January through April 1997.

Teachers at the Dallas LOT Workshop take their blood pressure and pulse rate.

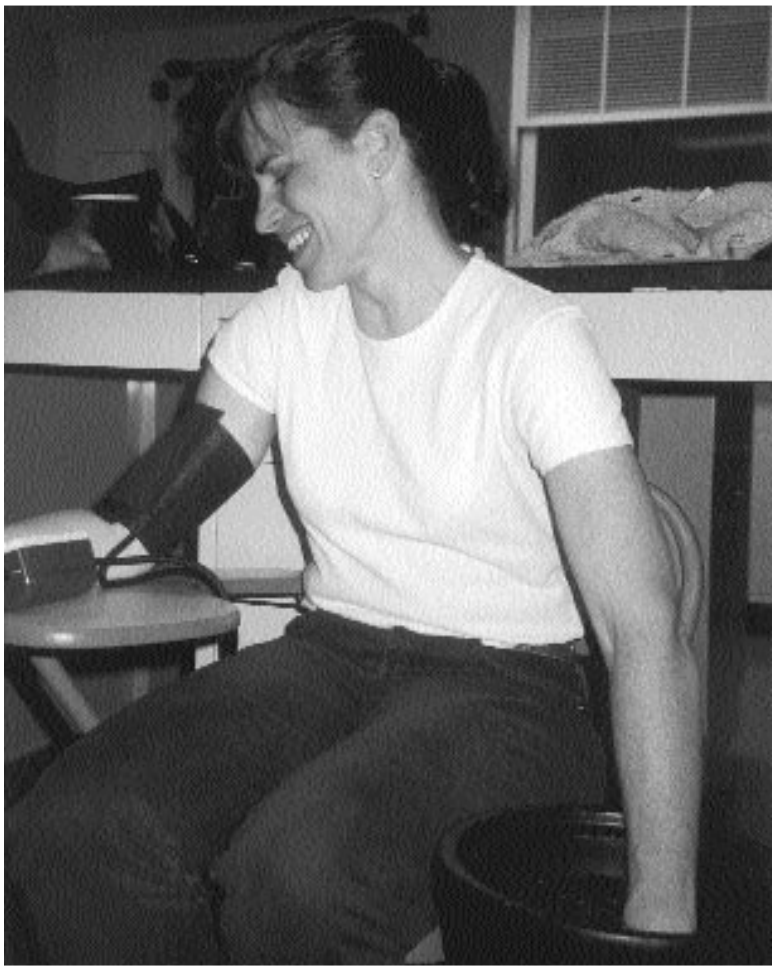
Assisted by Dallas LOT members, APS member Jureta Horton, center, demonstrates an activity at the Physiology of Fitness Workshop.

Della Sue Webb, Houston LOT member, left, explains a point to teachers at the Neural Networks Workshop. APS member, Norm Weisbrodt is in the background.

Teachers in Greenville, NC test the reflexes of one of the participants at the Neural Networks Workshop.

If you are interested in providing these physiology activities as an outreach program in your community and would like to apply to become a LOT, please contact: Marsha Lakes Matyas, Education Officer at 301-530-7132 or email: mmatyas@aps..faseb.org.

Greenville, NC teachers design an experiment to test reflexes.



A participant at the Physiology of Fitness Workshop in Valhalla, NY, has her blood pressure monitored while sticking her hand in a bucket of cold water.

The Fifth Annual Women in Physiology Mentoring Program and Reception

Hilton Riverside Hotel, Grand Salon 3/6
Monday, April 7, 1997, 6:30 pm

Featuring a speech by
Helen J. Cooke, Ohio State University

To be followed by information and a brief update
on The APS Mentoring Program for Women in Physiology
(Sponsored by the APS Women in Physiology Committee)

Physiological Reviews Boards Meet in Jerusalem and Santa Fe

Two meetings of the editorial boards of *Physiological Reviews* were held in 1996, one in June in Jerusalem by the Chair of the European Committee, Roger Green, and one on November 8 in Santa Fe, NM, by the editor of the journal, Walter Boron. The Jerusalem meeting was hosted by Baruch Kanner. Ulrich Pohl, the new European Committee Chair, was introduced at the meeting; he assumed the chairmanship in January 1997 for a term of three years. On behalf of the Society, Boron expressed his appreciation for the long and dedicated service provided to the journal by Green, who served seven years as European Committee Chairman.

Physiological Reviews Editorial Board Meeting. (l to r): W. F. Boron, R. Green, U. Pohl, C. A. R. Boyd, J. Bures, B. Kanner, K. Sandvig, C. Bauer, E. Carmeliet.

At each meeting, the Boards discussed the invited reviews from previous years that are still in progress, as well as the new invitations that each board member brought to the meeting. The editor reported that, although it is difficult to maintain a steady flow of manuscripts, the tightening process on invitations has been successful and the system is running smoothly.

Boron commented on the changes in style within the journal. The font and leading have been changed, and the headings have been made easier to follow. Abstracts have been introduced in the articles to enable them to be posted in *APStracts*, the Society's electronic journal, as well as being picked up by Medline. He stressed to both boards the need to make the introduction understandable to all physiologists, not specialists. On a trial basis in 1997, some figures in the journal will be redrawn to maintain a uniform style; author approval will be obtained, of course. *Physiological Reviews* has a new cover design since January 1997. ❖

Introducing ... Ulrich Pohl

Hans Ulrich Pohl was appointed Chairman of the European editorial committee of *Physiological Reviews* (*PRV*) on January 1, 1997. Pohl has been a member of the Society since 1989 and has served on the editorial board of *American Journal of Physiology: Heart and Circulatory Physiology*, another APS publication, for several years.

Pohl was born in Munich, Germany. He completed his internship in 1977 in the Departments of Endocrinology/Surgery at a Munich hospital and received his degree in 1978. As a research fellow at the Max Planck Institute of Systemic Physiology in Dortmund, he was trained in measuring tissue oxygen pressure in organs and studied the effects of ischemia-reperfusion on tissue oxygenation. He returned to Bavaria as a research associate at the Institute of Physiology at the University of Erlangen, where he teamed up with Rudi Busse to study the effects of hypoxamia on the skeletal muscle blood flow in his search for a vascular oxygen sensor.

After completing national service in the medical corps of the German Airforce, Pohl returned to the academic world as assistant professor at the Institute of Applied Physiology in Freiburg in 1982. He became an associate professor at this institute in 1987 and remained there for another three years. In 1990, he moved to the University of Lubeck. Five years later, he was made professor and chairman of the Institute of Physiology at the University of Mainz.

Ulrich Pohl's research activities have concentrated on aspects of circulatory physiology, with particular emphasis on the local control of vascular tone and blood flow and the role of andothelium-derived factors in this process. He has also examined the signaling pathways involved in endothelial factor production and gene expression, particularly in response to physiochemical stimuli such as shear stress, pulsatile stretching, and oxygen tension. Research in his laboratories has been funded by the Deutsche Forschungagemainschaft and other similar funding resouces and also by grants from the pharmaceutical industry and the German Society of Cardiology. He has received national and international recognition for his studies.

Pohl's main objective as Chairman of the *PRV* European Committee is to encourage his committee to invite and submit for publication the very best reviews in the many developing fields

Publications

of physiology and to offer physiologists engaged in research activities and in teaching a useful source of reference for the most attractive fields of physiological research. He believes these reviews will include not only trendy areas like molecular biology and cellular physiology but also systemic physiology, mathematical modeling of systems, and pathophysiology, which is an important basis for understanding diseases and rational treatment. His Committee hopes to attract manuscripts from the foremost research scientists working in these fields. He hopes, too, that authors and readers from the African and Asian countries that fall under the auspices of the European Committee will contribute to the success of the journal. He is looking forward to availing himself of the expert advice and help of former Chairman Roger Green, who contributed decisively to the success of the journal over the past six years, and the European Committee members, who are renowned experts in various fields of physiological research. He is equally looking forward to a successful working cooperation with the editor, Walter Boron, and American board members.❖

Books Received

Biological Rhythms & Exercise.
T. Reilly, G. Atkinson, and J. Waterhouse.
New York: Oxford University Press, 1996, 162 pp., illus., index, $47.50.
ISBN: 0-19-262524-1.

The Biology of Sea Turtles.
Peter L. Lutz and John A. Musick.
Boca Raton, FL: CRC, 1997, 432 pp., illus., index, $74.95.
ISBN: 0-8493-8422-2.

Boo! Culture, Experience and the Startle Reflex.
Ronald C. Simons.
New York: Oxford University Press, 1996, 272 pp., illus., index, $45.00.
ISBN: 0-19-509626-6.

Dental Anthropology.
Simon Hillson.
New York: Cambridge University Press, 1996, 373 pp., illus., index, $29.95.
ISBN: 0-521-56439-5.

Endothelial Cell Culture.
Roy Bicknell (Editor).
New York: Cambridge University Press, 1996, 136 pp., illus., index, $21.95.
ISBN: 0-521-55990-1.

Free Radicals in Brain Physiology and Disorders.
Lester Packer, Midori Hiramatsu, and Toshikazu Yoshikawa (Editors).
San Diego, CA: Academic, 1996, 474 pp., illus., index, $95.00.
ISBN: 0-12-543445-6.

Hemodynamics Basis of Atherosclerosis with Critique of the Cholesterol-Heart Disease Hypothesis. Second & Expanded Edition.
Meyer Texon.
New York: Begell House, 1996, 105 pp., illus., index, $87.50.
ISBN: 1-56700-029-0.

Human Physiology and Mechanisms of Disease (Sixth Edition).
Arthur C. Guyton and John E. Hall.
Philadelphia, PA: Saunders, 1996, 747 pp., illus., index, $52.95.
ISBN: 0-7216-3299-8.

In the Name of Science: Issues in Responsible Animal Experimentation.
F. Barbara Orlans.
New York: Oxford University Press, 1993, 297 pp., illus., index, $39.95.
ISBN: 0-19-507043-7.

Molecular Mechanisms in Striated Muscle.
S. V. Perry.
Lezioni Lincee. Luigi A. Radicati di Brozolo (Editor).
New York: Cambridge University Press, 1996, 168 pp., illus., index, $19.95.
ISBN: 0-521-57916-3

Nervous Control of the Heart, Vol. 9.
John T. Shepherd and Stephen F. Vatner (Editors).
The Autonomic Nervous System. Geoffrey Burnstock (Series Editor).
Amsterdam: Harwood Academic, 1996, 412 pp., illus., index, $140.00.
ISBN: 3-7186-5811-9.

Oxygen Transport To Tissue XVII.
C. Ince, J. Kesecioglu, L. Telci, and K. Akpir (Editors).
Advances in Experimental Medicine and Biology, Vol. 388.
New York: Plenum, 661 pp., illus., index, $139.50.
ISBN: 0-306-45200-6.

Pharmacology: Drug Actions and Reactions. Fifth Edition.
Ruth R. Levine, Carol T. Walsh, and Rochelle D. Schwartz.
New York: Parthenon Group, Inc., 569 pp., illus.,index, $50.00.
ISBN: 1-85070-780-4.

Physiology of Woody Plants. (Second Edition).
Theodore T. Kozlowski and Stephen G. Pallardy.
San Diego, CA: Academic, 411 pp., illus., index, $69.95.
ISBN: 0-12-424162-X.

Trace Elements in Laboratory Rodents.
Ronald Ross Watson (Editor).
Methods in Nutrition Research.
Ronald Ross Watson and Ira Wolinsky (Series Editors).
Boca Raton, FL: CRC, 1996, 391 pp., illus., index, $69.95
ISBN: 0-8493-9611-5.

Audiovisual Publication and Materials

Available from: **Milner-Fenwick, Inc.**, Timonium, MD

Complications of Cirrhosis. Emmet B. Keefe, Raymond S. Koff, Peter H. R. Green, Caroline A. Riely, and Santiago R. Vera. Clinical Teaching Project, American Gastroenterological Association, 1996, slide unit with text, $150.00.

Transplantation Immunology. Santiago J. Munoz. Undergraduate Teaching Project, American Gastroenterological Association, 1996, slide unit with text, $135.00.

Neurotransmitter Release and Its Modulation: Biochemical Mechanisms, Physiological Function, and Clinical Relevance

David A. Powis and Stephen J. Bunn (Eds)
New York: Cambridge University Press, 1995, 356 pp., illus., index, $49.95.
ISBN: 0-262-03231-7.

This multiauthored volume on neurotransmitter release and its modulation was the outgrowth of a symposium on this topic at the 13th International Congress of Neurochemistry, which took place in 1991. The book that ensued was a far more ambitious project, designed to cover the topic in a quite comprehensive manner but at a level useful for a broad readership rather than just for specialists in the field. What resulted was a single volume providing a comprehensive survey and analysis predominantly at the cellular level of neurotransmitter release, a fundamental biological process that has enormous relevance to physiology and pathophysiology of many disorders.

As discussed in the last section of this generally excellent volume, neurotransmitter release and modulation is central to understanding a number of vital issues, including: *1*) the most important drugs of abuse, e.g., nicotine, ethanol, exogenous opiates, amphetamines, and barbiturates; *2*) major diseases such as hypertension and depression; and *3*) a number of the most important pharmacotherapeutic agents, e.g., antidepressants, antipsychotic drugs, and antihypertensives. These are only some of the important concerns to which the modulation of neurotransmitter release by genetically controlled and environmentally determined factors are central. Thus, biologists with very diverse interests and approaches to research are likely to benefit from a first rate overview of neurotransmission and its modulation, as is achieved in this volume. I know of no other book that provides as authoritative an overview of this field by senior investigators for a broad based audience.

The first section of the book provides the basic information about the process of neurotransmitter release and its modulation. The three chapters included in this section cover *1*) the mechanisms of exocytosis and the central role of calcium (Burgoyne and Cheek); *2*) cotransmission (Sneddon); and *3*) models and mechanisms of neurotransmission (Bennett). As is the case with all the chapters in the book, the references generally run through 1993-1994. Nevertheless, one comes away from these chapters, which are very well written, with a clear understanding of the basic mechanisms of neurotransmitter release and its modulation, whose key features were already well elucidated at the time these chapters were written. While a great many important details have been elaborated since that time, there is no major facet of the process of neurotransmission or of its modulation that is not well described in these chapters. There are a modest number of illustrations that are quite helpful to explain basic concepts to those unfamiliar with the field. A few of the illustrations provide experimental data that enable the reader to understand the evidence behind the mechanisms described. The major techniques in current use are introduced, and the reader is given an overview as to the way they are utilized. Although written for a wide audience, the presentation is quite sophisticated and comprehensive. Considerable attention is given to integrating pharmacology and physiology. These chapters have frequent subheads that enable the reader to rapidly find material they might be specifically interested in.

The second section deals with modulation of neurotransmitter release and provides information about basic principles and the key factors in this process, e.g., autoreceptors, heteroreceptors, and local tissue factors and hormones, especially cortisol. The introductory chapter (Stjärne) provides an excellent overview of these mechanisms. The chapters on the role of autoreceptors (Brock), heteroreceptors (Fredholm), hormones and local tissue factors (Reid, Khali and Marley), and corticosteroid hormones as modulators of neurotransmitter release (Joels and deKloet) would be very useful for graduate students and researchers from other fields who want an up-to-date view of methodology, concepts, and key results. The chapter by Joels and de Kloet covers molecular biology in more depth than other chapters in this section. In general, the book makes no attempt to present a systematic view of the molecular aspects of the enzymes and other proteins involved in neurotransmitter release and its modulation. This is such a rapidly moving field that the presentation would have been quickly out of date had it sought to do so.

Section three concerns the cellular mechanisms that modulate neurotransmitter release. The first chapter in this section is, in fact, the most molecular of the chapters in the book. Majewski and Barrington describe the signal transduction mechanism that follows stimulation of presynaptic receptors. Bleakman and Miller discuss the regulation of calcium influx as a basis for modulation of neurotransmitter release. Calcium-independent mechanisms are discussed by Wakade and Przywara. They make it clear from the outset that this means modulation of calcium-dependent processes, not truly independent mechanisms. These three chapters are very comprehensive and quite well organized.

The next section concerns the physiological function of the modulation of neurotransmitter release. The purpose of this section is to summarize the evidence available from in vivo experiments that parallel the data mainly derived from in vitro studies at the subcellular, cellular, and tissue slice level covered in the preceding chapters. The chapter by Westerink that provides information about microdialysis and in vivo voltammetry does not provide the same depth of coverage as the chapters in the previous section, but it does provide evidence for the function of auto- and heteroreceptors in vivo and the pharmacologic characteristics of these receptors for monoaminergic neurons. The other chapter in this section, authored by M.R. Boarder, describes the modulation of secretion from neurosecretory cells into the blood stream rather than the synaptic cleft. This chapter is also rather skimpy but provides the reader with a basic understanding of the secretion of peptides, including pituitary hormones and catecholamines from the adrenal medulla, showing the similarities between these processes and those associated with neurotransmitter release.

The fifth and final section of the book discusses some prime examples of the clinical relevance of neurotransmitter release. The examples chosen include *1*) hypertension (Borkowski); *2*) antidepressant treatments

(Blier and de Montigny); *3*) modulation of neurotransmitter release by nicotine, ethanol, exogenous opiates, amphetamines, and barbiturates, each of which is authored by different people; and *4*) clinically useful treatment strategies dependent upon modulation of presynaptic mechanisms affecting neurotransmitter release (Westfall). The main topics discussed in the latter chapter are schizophrenia and the intriguing evidence of the clinical benefits to be derived from inhibiting dopamine release in the mesolimbic dopamine areas while enhancing dopamine release in the prefrontal cortex. This differential effect may lead to the decrease in delusions and hallucinations (mesolimbic mediation) and improvement in withdrawal and cognitive disturbance (mesocortical system). It also discusses the role of α_2 receptors in mediating insulin secretion and the multiple types of receptors that contribute to the regulation of norepinephrine release and thus contribute to the development of hypertension. This last section leaves the reader with a good sense of the great significance and complexity of this most important field of research.

In short, I think this is a volume well worth recommending to students and to anyone wanting a good overview of the regulation of neurotransmitter release. ❖

Herbert Y. Meltzer
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Calcium and Phosphorus in Health and Disease

John J. B. Anderson and Sanford C. Garner (Editors).
Boca Raton, FL: CRC, 1996, 395 pp.
illus., index $139.95.
ISBN: 0-8493-7845-1.

Intended as a teaching aid and to inspire budding researchers to enter the field of calcium and bone metabolism with a nutritional vantage point, this book employs a human function perspective. A wonderful foreword by Roy Talmage explains the properties of calcium that enable it to serve such a vital role in life processes and the interactions of calcium, phosphorus, and PTH at the bone. The book has 19 contributors, most of whom are from the University of North Carolina at Chapel Hill or Duke University, representing the legacy of the contributions in calcium and bone metabolism by Roy Talmage and Paul Munson. This number of contributors enables a breadth of perspective but leads to a small amount of redundancy and some gaps. For example, there is redundancy in the discussion of calcium absorption between chapters three and four. Regulation of calcium homeostasis by the gut and kidney is adequately discussed, but a thorough discussion of endogenous secretion is missing.

A particular strength of this book is the figures. Many are original drawings, which can easily be used to prepare overheads or slides for teaching aids. These alone warrant purchase of this book for those who attempt to communicate regulation and flow of calcium and phosphorus.

Chapters are grouped into five main sections: calcium and phosphorus metabolism and homeostasis, structure and function of skeleton and teeth and biomarkers of bone turnover, endocrine regulation of calcium and phosphorus, requirements of calcium and phosphorus throughout the life cycle, and osteoporosis. A good balance is offered between practical nutritional advice on how to achieve adequate intakes of calcium in the diet and lifestyle choices to reduce risk of osteoporosis to basic physiological mechanisms of regulating cellular levels of calcium and phosphorus. Although regulation of calcium homeostasis at the cellular level is discussed, the role of calcium as a second messenger in stabilizing proteins and other functional roles aside from its reserve function in skeletal integrity is not delineated in detail. A short but provocative chapter on potential fruitful areas for further study ends the book.

The review of the literature for most of the chapters represents a good overview of the state of knowledge up until mid-1994. Understandably, several reports have been released since then which have moved our understanding beyond this book. For example, calcium intakes of the nation from NHANES III have been reported. A new NIH consensus conference panel on optimal calcium intakes released a report. Several more studies have been reported in which slow calcium supplementation increases bone mass postpuberty, but the advantage is lost upon cessation of supplementation. Calcium and vitamin D supplementation was shown not to be effective in offsetting lactation-induced bone loss. Nevertheless, this book represents an easy-to-read text for students interested in calcium and bone metabolism. The flow of the book is logical. The perspectives and illustrations are very good. The text can be easily augmented with recent articles to present a comprehensive overview for students. ❖

Connie Weaver
Purdue University

Patch-Clamp Applications and Protocols

Alan A. Boulton, Glen B. Baker, and Wolfgang Walz (Editors).
Neuromethods 26. Alan A. Boulton, Glen B. Baker (Program Editors).
Totowa, NJ: Humana, 1995, 336 pp., illus., index, $89.50.
ISBN: 0-89603-311-2

This book, written by experts in the field, is a useful addition to the reference list of patch-clamp techniques. The book features practical protocols and useful tips on how to perform patch-clamp experiments and is particularly valuable for investigators and students who spend their time collecting data at the patch-clamp rig.

The book collects a set of hands-on protocols on commonly used patch-clamp techniques, including whole cell recording (Sontheimer), single-channel recordings from excised patches (Nichols et al.), perforated patch techniques (Walz), and the loose patch clamp (Caldwell and Milton). These chapters are uniformly well written with concise discussions on basic principles and limitations, step-by-step descriptions of experimental procedures, and tips on troubleshooting common problems. Levis and Rae provide a thorough discussion of patch-clamp electrodes, which are essential for successful experiments. The chapter on the whole cell patch includes a discussion on

data analysis and evaluation, which provides guidance on how to collect quality data in whole cell recordings. Lack of discussion on single-channel data analysis is a shortcoming of the book, since data collection is certainly blinded without any knowledge of how to evaluate and analyze single-channel data. A brief mention of liquid junction potentials, a systematic error source for the voltage measurement in patch clamp, is insufficient. Readers of this book should consult other books on these topics (2), (3).

The book describes several methods developed for patch clamp to stimulate ligand-gated and mechanosensitive ion channels and to control solutions on both sides of the membrane. The pressure clamp (Hamill and McBride, Jr.) allows the study of gating mechanisms of mechanosensitive ion channels, especially transient behaviors such as adaptation. The patch/whole cell perfusion technique permits efficient solution change inside the patch pipette (Tang et al.). The concentration clamp is one of the techniques for rapidly delivering ligands, modulators, or pharmacological agents (Akaike). The technique is useful for excised patches and cells loosely attached to substrates but not for cells that are firmly adhered to substrates, such as most tissue-cultured cells. This limitation can be avoided using alternative methods for rapid solution change (Nichols et al.).

A powerful combination of patch-clamp and molecular biology techniques allows the molecular study of ion channel structure/function relations. There are two approaches to the problem: *1*) expressing cloned channel subunits in a heterologous system and *2*) dissecting out types and subunit compositions for endogenous ion channels in native cells. Two excellent chapters are included in the book. One chapter describes *Xenopus* oocytes in almost every aspect as a most commonly used heterologous expression system for ion channels (Smart and Krishek). One important observation, however, for the oocyte system is not mentioned: poor expression of channel clones in oocytes is often observed in summer or fall. Quick et al. (1) have developed a procedure to overcome this mysterious seasonal variation by incubating oocytes in a medium containing 5% horse serum. The trick has worked well in my lab during the last three years. A variety of other heterologous expression systems can be found elsewhere (2).

The other chapter (Lambolez et al.) describing in great detail the combination of patch clamp with RT-PCR is highly recommended. This powerful technique permits establishing a correlation in single cells between functional heterogeneity of ion channel proteins measured by patch clamp and molecular isoforms of the channel subunit mRNAs detected by RT-PCR. Moreover, when combined with patch clamp techniques in brain slices (see the chapter by Plant et al.), RT-PCR can be applied to single cells in brain slices (3). A wealth of information is being obtained on ion channel properties and distributions from single neurons within neural networks. ❖

References

1. Quick, M. W., J. Naeve, N. Davidson, and H. A. Lester. Incubation with horse serum increases viability and decreases background neurotransmitter uptake in *Xenopus* oocytes. *BioTechniques* 13: 357-361, 1992.
2. Rudy, B., and L. E. Iverson (Eds.). *Ion Channels*: *Methods in Enzymology*. San Diego, CA: Academic, 1992, Vol. 207.
3. Sakmann, B., and E. Neher (Eds.). *Single-Channel Recording* (2nd ed.). New York: Plenum, 1995.

Xian-Cheng Yang
Cornell University Medical College

Behavior, Population Biology and Physiology of the Petrels

John Warham
London: Academic, 1996, 613 pp., illus., index, $99.95.
ISBN: 0-12-735415-8

Behavior, Population Biology and Physiology of the Petrels is the second of a two volume work by John Warham, the foremost authority on the order Procellariiformes or petrels. The group includes the largest of all seabirds, the albatross, and the petrels are undoubtedly the most pelagic of all seabirds, coming ashore only to lay their eggs and rear their young. I must confess that I opened the second volume with a considerable degree of bias in its favor. The first volume, *The Petrels: Their Ecology and Breeding Systems*, has been my vade mecum since its appearance in 1990. It contains a general description of the species, as well as much information on their reproductive biology.

The volume under review lives up to the reputation established by the earlier book. It opens with chapters on population (the Procellariiformes are the most successful of all seabirds), distribution, and migrations (one species of shearwater makes a sea passage of 32,000 km every year.) Chapters on feeding, behavior, and vocalizations follow, and then there is a chapter on physiology and energetics that is likely to be of most interest to readers of the present review. The chapter is not a comprehensive summary of the physiology of petrels for the simple reason that very little is known about their physiology. There is much information in the chapter on the thermoregulation and energetics of petrels and relatively little on their cardio-pulmonary-renal systems. This is partly because it is easier to investigate the former under field laboratory conditions and partly because of the interests of investigators who have had access to petrels. The chapter includes a section on the incubation physiology of petrels. Interest in their incubation derives from the fact that incubation in petrels is extremely prolonged. Related to prolonged incubation is slow embryonic growth and a greatly reduced rate of gas exchange by diffusion through microscopic pores in the eggshell. One feels after reading the chapter that one has been accorded a tantalizing glimpse of the treasures that await future investigators of the physiology of these remarkable birds.

The next chapter is entitled biochemistry, and it is also likely to be of interest to many physiologists. Again, it is not a comprehensive review of biochemistry; rather, it deals with what information is available. This consists largely of the biochemistry of pollutants and of the stomach oils that are a special feature of petrels. Of equal interest is a chapter on anatomical matters. The large glandular proventriculus (stomach) is a characteristic feature of petrels. So is the unusual development (for birds) of the olfactory bulbs in the brain. Virtually nothing is known about the anatomy of some

organs; the lungs are a case in point. A chapter on locomotion is interposed between the chapters on biochemistry and anatomy. It is not clear why (a small quibble), but the chapter is important because petrels are the masters of flight amongst birds.

The volume closes with chapters on evolution and the relationships between the birds and people, with the result being that the two volumes taken together cover all aspects of the biology of petrels. The book is illustrated with line drawings that are quite effective. The bibliography alone is worth its weight in gold. The book is clearly written, up-to-date, and meticulously researched. It illustrates the benefits of having been written by a a single author. The two volumes are, in fact, a remarkable achievement for one person, and a large debt of gratitude is owed to Warham for this magnificent contribution to seabird biology. ❖

G. Causey Whittow
University of Hawaii

Human Energetics in Biological Anthropology

Stanley J. Ulijaszek
New York: Cambridge University Press,1995, 235 pp., illus., $135.00
ISBN: 0-19-262504-7

Stanley J. Ulijaszek is a professor of biological anthropology at the University of Cambridge and an anthropologist with broad experience in field research of topics of energy metabolism in widely scattered regions of the world. His experience in the field of energetics and its relation to the biology of individuals and populations is evident in this monograph, which is directed to students and teachers of biological anthropology, human population biology, nutrition, and nutritional anthropology.

After a brief and informative introduction of the historical development of modern concepts in ecology, energetics, and adaptation/adaptability, the presentation is divided into sections on theory and methods and energetics and anthropology.

In the first section, the complexity of the factors at play in the field of energetics is outlined in the chapter on the relationship(s) between the individual and the group. As an introduction to the balance between the various components of energy intake and expenditure, the author makes a good selection of material to present for the discussion of individual and group contributions to productivity and work efficiency, performance, and capacity. The presentation of this difficult topic is fortunately a simplified one that focuses on those components designed to encourage the beginner to look further into the literature and provides the references to do so. The chapter on methods is a fairly complete discussion of the methodology of measuring dietary energy intake and energy expenditure with a discussion of the pitfalls of each method. There is excellent reference material throughout for the neophyte to find his/her way to more detailed information. There is also a brief discussion of the measurement/estimation of the maximal oxygen consumption and newer methods of determining body composition. As students are one of the target audiences of this monograph, they might have been better served by a presentation of the more traditional methods as well, such as the principles of underwater weighing and the use of skinfolds and the derivation of empirical equations used to estimate body fat and lean body mass. The final chapter in this section covers modeling and is a mystery to this reviewer. It is, therefore, a source of revelation and learning that underlines the interchangeable role of student and teacher in the reading of a broadly based book such as this.

The second section is directed toward the application of energetics to anthropology and consists of five chapters. The first, on reproductive performance, is a good summary of current thinking on the effects of psychological, nutritional, and energetic stress on the fertility rates of populations and on the course of pregnancy and lactation in both the developing and developed regions of the world. The chapter is rich not only in comparative survey data of pregnancy and lactation but also in discussion of the physiology of these two reproductive states, as affected by physical activity, energy balance, and nutritional status. The discussion of the maternal depletion syndrome is interesting but too short, perhaps because of a paucity of data. The next chapter focuses on growth and body size. Following a brief review of the genetic potential for growth, the effects of population migrations, and environmental effects on body size, the author gives an excellent discussion of the pros and cons of present international growth standards and the question of catch-up growth when individuals undergoing growth retardation are placed in more favorable environments. There is a good presentation of the influence of both nutritional factors and infection on the faltering of growth early in life, as well as after three years of age and into adolescence. Of the nonenergy nutritional deficiencies that might be involved in slowed growth, no mention is made of zinc. The downside of the "downsizing" of adult body size is discussed well but too briefly. The chapter on energy, effort, and subsistence should be a revelation to readers with little knowledge of either short- or long-term subsistence practices and their patterns of development in various populations. It is a fascinating topic presented in such a way as to make further inquiry a must, emphasizing the usefulness of this book to people with a range of experience in the field of energetics. Similar comments can be made of the role of energetics in maturation, encephalization, and the development of running speeds during the course of human evolution in the following chapter. The final chapter is a first-rate summary of seasonality and energy balance, as evidenced by changes in body weight and body composition and reproductive performance (birth rates, milk production) with some discussion of adjustments in BMR that may occur in wet/dry seasons in the tropics. There seem to be no such data from similar studies in climates where there are wide swings in environmental temperatures between winter and summer seasons.

This monograph is very good for its stated purposes, i.e., to aid teachers and students of biological anthropology. It also could be used by students of applied physiology interested in the application of energetics to human function. It can be the portal to the research literature on energetics for anyone who wishes to delve into the field. While it should be on the shelves of any university library and those of teachers of the subject, it may be a bit pricey for the pocketbooks of students. However, for those students who intend to enter the field, it may be a worthwhile investment. ❖

G. B. Spurr
Medical College of Wisconsin

Biological Flows

Michael Y. Jaffrin and Colin G. Caro (Editors)
New York: Plenum, 1995, 367 pp., illus., index, $95.00
ISBN: 0-306-45206-5

This volume contains review chapters summarizing a collection of lectures presented at the Second World Congress of Biomechanics, which was held in Amsterdam in 1994. As such, it presents an overview of a variety of subjects related to biomechanics. This volume begins with an excellent historical perspective on biomechanics by R. Skalak (chapter one). This is followed by an excellent overview of the role of the endothelium in blood flow regulation by Y. C. Fung and S. Q. Liu (chapter two). These authors make a plea for detailed analyses of endothelial cell anatomy and function, as well as a combined theoretical and functional approach to address the complex issues that have arisen in local blood flow regulation. Chapters three (Pedley), four (Giddens, Tang, and Loth), and five (Caro and coworkers) provide excellent discussions of arterial fluid dynamics, particularly at arterial branch points and where vascular grafts are located. These chapters are complimented by an excellent review by Perktold and Rappitsch of computer models depicting blood flow in major vessels (chapter six). An ambitious attempt to describe intraventricular flow dynamics is presented, along with an analysis of vascular wall stressed development, by T. Yamaguchi in chapter seven. The chapter by Stergiopulos and Meister (chapter eight) stresses vascular wall mechanisms involved in vascular dynamics at the expense of neurohumoral mechanisms that are so involved.

The architecture of the peripheral blood vessels is presented in a concise and comprehensible fashion in chapter nine by Secomb, Pries, and Gaehtgens. This is followed by an excellent overview by Lever (chapter 10) of current concepts evolving to describe mass transport through the walls of arteries and veins, which includes a discussion of transport into the wall of major arteries. This is followed by theoretical consideration of filtration through artificial membranes (chapter 11). Chapter 12 by Westerhof focuses on how cardiodynamics is matched to aortic flow. This chapter focuses primarily on ventricular pressure-flow relationships and the generation of heart power in relatively rigid mechanistic terms without consideration, for instance, of neurohumoral mechanisms.It is difficult for this reviewer to accept the statement that heart rate changes do not affect end-diastolic dynamics (p. 247) given the fact that alterations in heart rate have direct consequences on neurohumoral mechanism-regulated cardiodynamics.

Kajiya and coworkers (chapter 13) discuss ventricular intramural vascular flow. The limited success of this chapter is due in part to the poor quality of the original data presented, as well as the limited discussion of the extensive literature in this field. In contrast, current models of coronary flow are presented by J. Spaan in chapter 14 in much greater depth. He presents recently obtained data in a clear fashion, including discussing blood flow in major coronary veins. Spann introduces novel concepts, stating for instance that "there is not much reason to support the waterfall model in predicting the effect of contraction on coronary flow in a normal beating heart" (p. 271). The chapters dealing with cardiovascular dynamics are followed by two which present current concepts of respiratory mechanics (chapters 15 and 16). An excellent analysis of respiratory flow control during support modes is presented by Isabey, et al., in chapter 16. The last chapter of this volume (by Schmid-SchÜnbein and Ikomi) provides a brief but focused analysis of lymphatic transport.

Overall, this volume presents a number of recent issues in biological flows. Given the fact that some of the authors involved choose to review data obtained primarily from their own laboratories, not all chapters provide a balanced overview of the subject matter at hand. Furthermore, the references listed by some authors focus too much on the author's own work, neglecting earlier work on the same subject matter (c.f., chapter 12). Perhaps this tendency is a consequence of the fact that the chapters in this volume are derived from a collection of presentations made at a scientific congress. A small but important issue is the fact that the font size used in this volume is small, thereby making it difficult to read. Furthermore, references are presented differently in different chapters. A few proofing errors are present as well, suggesting a lack of attention to the final presentation of this volume. In conclusion, this volume presents some of the issues in biological flows currently undergoing intensive investigation, discussing flows in major arteries with particular clarity. ❖

John A. Armour
Dalhousie University

Web News

Travel the Web for Travel Information

In looking at the scientific meetings and congresses calendar in the December issue of *The Physiologist*, I noticed that meetings are being held in some pretty exotic sites, like St. Petersburg, Russia; New Orleans; and Park City, UT. I checked the World Wide Web to see what kind of travel information is available.

I started at Yahoo's Recreation: Travel page, at **http://www.yahoo.com/Recreation/Travel/**. From there, I looked at some general travel pages. The CNN Travel page at **http://www.cnn.com/TRAVEL/** offers features on a variety of destinations and a guide to tourism information for each US state. In the "Getting Ready" section, CNN offers a comprehensive list of links, including travel and health information from the Centers for Disease Control, travel warnings and consular information from the State Department, weather information, and a currency converter. Pathfinder's travel site at **http://pathfinder.com/travel** offers links to the Zagat Restaurant Guides for cities throughout the US. Pathfinder also features a book-a-flight service that makes it easy to compare fares and schedules among major airlines and a list of useful phrases in many languages.

Two famous guidebooks also lend their names to great travel sites. Fodor's (**http://www.fodors.com/**) has an interactive personal trip planner. You can choose a destination city and Fodor's will tell you where to stay, where to eat, what to see, and what time of year to visit. My favorite site, however, is Lonely Planet's site at **http://www.lonelyplanet.com**. Lonely Planet relies heavily on first-hand information from travellers and so is very current. Check out the Postcards section for the latest tips and stories from residents and visitors. The Freetime Guide at **http://www. ftguide.com/WEBFM/ftg/search.html** is a good way to find out what will be happening in a US city during a specific time period. Enter your destination and the dates you expect to travel, and the Freetime Guide gives you a list of festivals, fairs, exhibitions, and attractions you can visit.

I used some of the sites mentioned above, as well as Yahoo and AltaVista, to find out more about St. Petersburg, New Orleans, and Park City. For example, Lonely Planet's St. Petersburg page at **http://www.lonelyplanet.com/dest/eur/stp.htm** collects almost everything you would want to know about the city, including maps. I really enjoyed the Fresh Guide to St. Petersburg at **http://www.online.ru/sp/fresh/**. It is big, and it covers everything from shopping to museums to zoos to ice fishing to bungee jumping. It is also very fun to read.

New Orleans Online (**http://neworleansonline.com/**) is a complete guide to New Orleans, site of Experimental Biology '97. You can find information about dining, hotels, tours, music, and sporting events here. There is also the Travel Channel's New Orleans site at **http://www.travelchannel.com/spot/norleans/welcome.htm**. If you follow the site from page to page, you will end up with a pretty good overview of things to do and see in New Orleans. For Park City, try **http://www.pcski.com/** and **http://www.netpp.com/parkcity/**.

If you happen to come across any great travel sites that I have missed, e-mail the URL to me at kthompso@aps.faseb.org, and I will include them on the appropriate meeting page. Also, if you have questions, comments or suggestions, let me know. Your URLs will be published in future editions of *The Physiologist*. ❖

WWW Site to Explore

Submitted by Brian J. Knoll, the URL for February is the home page of the Department of Molecular Physiology and Biophysics at the Baylor College of Medicine at **http://www.bcm.tmc.edu/physio/**.

Positions Available

Cardiovascular Postdoctoral Research Position. Full-time position available immediately in laboratory at the University of South Florida College of Medicine with interests in the autonomic and neuropeptide control of vascular and cardiac muscle contraction and relaxation and signal transduction. Individual should have knowledge of whole organ and isolated tissue investigations, molecular biological techniques, radioimmunoassay, computer data base and statistical software. Submit curriculum vitae, summary of research interests, and the names of three references to Robert J. Henning, MD, Professor of Medicine, Cardiology Division, 111A, University of South Florida College of Medicine/James Haley Hospital, 13000 Bruce B. Downs Blvd., Tampa, FL 33612-4799 (phone: 813-978-5873; fax: 813-978-5884).

Positions Available

There is a $50.00 charge for each position listed. Positions will be listed in the next available issue of *The Physiologist* and immediately upon receipt on the APS Gopher Information Server. A check or money order payable to "The American Physiological Society" must accompany the position listing. **Copy must reach the APS office before the first of the month, one month preceding the month of issue.** Mail copy with payment to: *The Physiologist*, APS, 9650 Rockville Pike, Bethesda, MD 20814-3991.

Letter to William J. Stekiel

Albert R. Dawe writes: "You have asked that I give you some 'words of wisdom' now that I have entered my 80th year of life. Actually, it is I who should be checking with the young ones to procure deeper understandings, not the reverse!

"The civilized world, it seems to me, rapidly is becoming a vast series of digitized, analog, computerized, push button operations exercised in finger tip manipulations, all of which are far more productive than any other schema. 'Black boxes' centralize information and act the part of administrator. They even give orders. In experimental procedures, those who are really successful scientists will belong to that small group of scientists who understand the interior and exterior construction of black boxes that pass his or her way. It may be program by intuition.

"Finally, art in its many forms and music with mathematics make all of physiological science worthwhile. A symphony by Haydn or a painting by Renoir has few peers, and I have always relied on a blessed God to direct my way and direct the way of our fellows. What did God do? He grew the beautiful flowering gardenia bush at our lovely patio in Arizona."

Eugene M. Renkin writes: "Many thanks for your birthday greeting. I knew it was coming, and I have been searching my mind for something to write in response to our Committee's letter.

"I 'retired' two years ago. In my case, this meant beginning a gradual

process of withdrawal from the activities of my career. I am no longer active in laboratory research but continue to analyze and write about items from a backlog of unpublished experimental work. I am also still reading and trying to keep up with current developments, particularly in areas that I let slip when involved in heavy lab work. I look forward to a future phase of writing critiques of recent publications that arouse my passion one way or another as 'letters to the editors.'

"My contributions to department, school, and university are largely on a volunteer basis. It is nice to be asked politely and have the option of saying, 'No.' I am still teaching in our medical physiology course but will gradually withdraw over the next two or three years to let our new faculty members increase their teaching input. I do some consulting with other research workers at my own and other institutions, and I still do referee service for several physiology journals. And finally, I am a member of the APS Senior Physiologists Committee and write letters to other senior physiologists.

"On the nonprofessional side, I am devoting increasingly more time to R&R: reading; listening to music at home; going to concerts, plays, and operas; and traveling with my wife to visit our grown-up 'children.' Advice for others? Plan your retirement well in advance and do not wait too long."

Letter to Eugene M. Renkin

Alvin E. Lewis writes: "Thank you and the Senior Physiologist Committee for your birthday greetings. I am no longer practicing or teaching, but I do maintain an active interest in the exciting advances in biology and medicine. My subscription to the New England Journal of Medicine and weekly 'grand rounds' at Santa Rosa's community hospital adequately fill my needs in this regard.

"To celebrate my 80th birthday, I treated myself to a very nifty (i.e., expensive) laptop computer. I am still too new to the Internet to pass any judgment on its value, but so far I find it quicker and easier to use my old Encyclopedia Britannica. At present, I am writing a set of science history essays showing how the cultural attributes of a community or nation foster innovation in science and technology. I do not know if I will ever finish and assemble these items into chapters of a book, but for now they provide me a great deal of satisfaction.

"Again, I thank you for noticing my birthday. To any old friends who may see this note, I send best wishes for health and happiness." ❖

People and Places

Maria Luiza C. Albuquerque has left the Division of Critical Care Medicine, St. Jude Children's Research Hospital, Memphis, TN, to accept a position with the Pediatrics Department, Northwestern University, Chicago, IL.

Moving from the Department of Psychology, University of California at Riverside, **Vasiliki Bessie Aramakis** has recently joined the Department of Psychobiology, University of California at Irvine.

Christian A. Combs has left the Department of Biological Sciences, Florida State University, Tallahassee, FL, to accept a position with the Laboratory of Cardiac Energetics, National Heart, Lung, and Blood Institute, Bethesda, MD.

Michael John Emery has accepted a position with Pulmonary and Critical Care Medicine, University of Miami School of Medicine, Miami, FL. Previous to his new assignment, Emery was with the Division of Pulmonary and Critical Care Medicine, University of Washington School of Medicine, Seattle, WA.

Formerly with the Department of Cardiology, Montefiore Medical Center, Bronx, NY, **David Lee Geenen** has accepted a position with the Cardiology Division, Albert Einstein College of Medicine, Bronx, NY.

Accepting a position with the Department of Physiology/Biophysics at the University of Mississippi Medical Center, Jackson, MS, **Jeffrey R. Henegar** was previously associated with the College of Veterinary Medicine at Auburn University, Auburn, AL.

Sharon R. Inman is currently with the Renal Transplantation Department, Loyola University Medical Center, Maywood, IL. Prior to her new position, Inman was with the Department of Urology, Cleveland Clinic Foundation, Cleveland, OH.

No longer affiliated with the Department of Pharmacology and Toxicology, Xoma Corporation, **Yue Lin** has accepted a position with the Department of Pharmacology, Bayer Corporation, Berkeley, CA.

Roberto Maass-Moreno has moved from the Department of Physiology and Biophysics, Indiana University School of Medicine, Indianapolis, IN, and has accepted a position with the Department of Electrical Engineering, Purdue University, Indianapolis, IN.

Kimberly Mayfield is now associated with the Lovelace Research Institute, Albuquerque, NM. Prior to her new position, Mayfield was affiliated with the Department of Pharmacology, University of Arizona, Tucson, AZ.

Peter Nadim Nassar is now associated with the Department of Geology, Bryn Mawr College, Bryn Mawr, PA. Previous to his new assignment, Nassar was affiliated with the Department of Biology, University of Utah, Salt Lake City, UT.

Appavoo Rengasamy has accepted a position with the Pathology and Physiology Research Branch, NIOSH, Morgantown, WV. Prior to accepting his position, Rengasamy was affiliated with the Department of Anesthesiology, the University of Virginia Health Science Center, Charlottesville, VA.

Having affiliated with the Department of Biology, California State University, San Bernardino, CA, **Colleen Rebecca Talbot** has left the Pulmonary Research Center, University of North Carolina, Chapel Hill, NC.

Loren P. Thompson has accepted a position of assistant research scientist, University of Maryland at Baltimore. Formerly, Thompson was with the Department of Obstetrics and Gynecology, University of Iowa Hospitals and Clinics, Iowa City, IA.

Moving from the Department of Physiology, Louisiana State University, Shreveport, LA, **Patrick P. Tso** has joined the Department of Pathology and Laboratory Medicine, University of Cincinnati College of Medicine, Cincinnati, OH.

Alice Renee Villalobos has become affiliated with the Department of Physiology and Neurobiology, University of Connecticut, Storrs, CT. Prior to her new position, Villalobos was associated with the Laboratory of Cell and Molecular Pharmacology, NIEHS, Research Triangle Park, NC.

Currently, president of Weissing Solutions, Inc., Saratoga, CA, **Judi L. Weissinger** was Vice President of Applied Immune Sciences, Department of Regulatory Affairs and Corporate Quality, APR Gencell, Santa Clara, CA.

Formerly, professor and chairman of the Department of Internal Medicine at the University of Michigan Medical Center, **Tadataka Yamada** is now president of SmithKline Beecham Healthcare Services, Philadelphia, PA.

Michael F. Zanakis is now director of research, Kestler Research Institute for Rehabilitation, West Orange, NJ. Prior to his new position, Zanakis was director of the Department of Physiology, New York College of Osteopathic Medicine, Old Westbury, NY. ❖

Correction:

In the December issue, it was reported that John A. Payne had accepted a position with Loma Linda University.

Our information was incorrect. Payne remains at the University of California, Davis.

We apologize for the error. ❖

Announcements

1998-99 Fulbright Awards for US Faculty and Professionals

Opportunities for lecturing or advanced research in more than 135 countries are available to college and university faculty and professionals outside academe. US citizenship and the PhD or comparable professional qualifications required. For lecturing awards, university or college teaching experience is expected. Foreign language skills are needed for some countries, but most lecturing assignments are in English.

The deadline for lecturing or research grants for 1998-99 is August 1, 1997. Other deadlines are in place for special programs: distinguished Fulbright chairs in Western Europe and Canada (May 1) and Fulbright seminars for international education and academic administrators (November 1).

Contact the USIA Fulbright Senior Scholar Program, Council for International Exchange of Scholars, 3007 Tilden Street NW, Suite 5M, Box GNEWS, Washington, DC 20008-3009. Tel: 202-686-7877; Internet: http://www.cies.org; e-mail: cies1@ciesnet.cies.org (requests for mailing of application only). ❖

Educational Workshops in Interdisciplinary Research

The NIH Office of Behavioral and Social Sciences Research (OBSSR) in conjunction with the National Institute of Nursing (NINR), the National Institute on Drug Abuse (NIDA), and the National Center of Research Resources (NCRR) is announcing a Request for Applications (RFA) focusing on "Educational Workshops in Interdisciplinary Research."

The goal of this RFA is to foster the development of cross-disciplinary communication and research collaboration among various behavioral and social sciences or between behavioral/social sciences and biomedical sciences. To achieve this goal, short-term (1-2 week) education programs in interdisciplinary research aimed at social/behavioral and biomedical researchers during the formative stages of their careers will be funded.

The RFA is announced in the Winter of 1996 in the weekly NIH *Guide for Grants and Contracts*. The *Guide* may be found on the NIH Home Page (**http://www.nih.gov**). In addition, look for the announcement on the Office of Behavioral and Social Sciences Research Home Page (**http://www1.od.NIH.gov/obssr/obssr.htm**).

For additional information, contact: Gerdi Weidner, Office of Behavioral and Social Sciences Research, NIH, Building 1 Room 326, Bethesda, MD 20892-0183. Tel: 301-402-1146; e-mail: gerdi_weidner@nih.gov. ❖

PRIM&R and ARENA's Annual IACUC Meetings

Public Responsibility in Medicine and Research (PRIM&R) and Applied Research Ethics National Association (ARENA) are proud to announce their annual conferences on issues relating to animal care, animal research, and research review. The meetings will be held in San Diego, CA, March 16-18 and are entitled "Implementing the Regs: An ARENA Primer — Back to the Basics" and "Animal Care and Use in a Changing Research Environment: Ethics, Technology, Accountability, and Efficiency."

The meetings will focus on practical and conceptual issues in animal research. Topics to be covered include:

- Xenotransplantation, Gene Therapy, and the Use of Transgenics
- Emerging *Guide* Issues
- USDA and OPRR Updates
- Animal Care and Use with an International Perspective
- Implementation of Performance Standards

The conference will also train and assist Institutional Animal Care and Use Committee (IACUC) members, administrators, and scientists in the ongoing challenge of conducting responsible and ethical research in an era of rapid change and development.

The conference will include plenary addresses, panel discussions, and more than 30 workshops presented by a diverse faculty of experienced animal researchers; representatives from OPRR/NIH, USDA, FDA, ILAR, and AAALAC International; institutional administrators; and representatives of biotechnology companies and animal welfare organizations. Small discussion groups will provide a forum for the development of effective strategies to address common concerns. In addition, a staffed resource room stocked with organizational resources and articles relevant to animal care and research will be of particular value to participants.

The PRIM&R and ARENA meetings will be held at the San Diego Princess Resort, 1404 West Vacation Road, San Diego, CA 92109-7994. For reservation information, please call 800-344-2626. For further information regarding the meetings, contact Joan Rachlin, Executive Director, PRIM&R, 132 Boylston St., Boston, MA 02116. Tel: 617-423-4112; fax: 617-423-1185; e-mail: prmr@aol.com; Website: http://www.aamc.org/research/primr. ❖

Scientific Meetings and Congresses

1997

February 18-22

10th International Hypoxia Symposium: Women at Altitude, Lake Louise, Alberta, Canada. *Information*: Sharon Studd, Faculty of Health Sciences, McMaster University, Room 1M7, 1200 Main Street West, Hamilton, Ontario, Canada L8N 3Z5. Tel: 905-525-9140; fax: 905-572-7099; e-mail: studd@fhs.csu.mcmaster.ca.

February 22-28

Medical Imaging '97, Newport Beach, CA. *Information:* SPIE, PO Box 10, Bellingham, WA 98227-0010. Tel: 360-676-3290; fax: 360-647-1445; e-mail: spie@spie.org.

March 2-6

41st Annual Meeting of the Biophysical Society, New Orleans, LA. Information: Emily M. Gray, Executive Director, Biophysical Society, 9650 Rockville Pike, Suite L-0512, Bethesda, MD 20814-3998. Tel: 301-530-7114; fax: 301-530-7133; e-mail: society @biophysics.faseb.org; internet: http://www.tulane.edu/~biochem/ biophys97/top.htm.

March 2-7

Principles and Practices of Tracer Methodology in Metabolism, Galveston, TX. *Information*: Robert R. Wolfe, Metabolism Department, UTMB/Shriners Burns Institute, 815 Market Street, Galveston, TX 77550. Tel: 409-770-6605; fax: 409-770-6825.

April 4-6

16th Southern Biomedical Engineering Conference, Biloxi, MS. *Information*: Department of Restorative Dentistry/Biomaterials, University of Mississippi Medical Center, Jackson, MS 39216-4505. Tel: 601-984-6170; fax: 601-984-6087.

April 10-11

Hypoxia and Reoxygenation: From Basic Science to Pediatric Cardiac Surgery, Glasgow, Scotland. *Information*: Michele Samaja, Department of Biomedical Sciences and Technology, University of Milan, 60, via Olgettina, Milan, Italy 20132. Fax: 39-2-264-23355; e-mail: samaja@itba.mi.cnr.it.

April 11-12

American Board of Electrodiagnostic Medicine Certification Examination, Chicago, IL. *Information*: ABEM, 21 Second Street SW, Suite 103, Rochester, MN 55902. Tel: 507-288-0100; fax: 507-288-1225; e-mail: abem2@aol.com.

April 11-13

International Dermatology Symposium, Berlin, Germany. *Information:* Department of Dermatology, University Medical Center Benjamin Franklin, Free University of Berlin, Hindenburgdamm 20, D-12200 Berlin, Germany. Tel: 4930-8445-2808; fax: 4930-8445-4262.

April 23-25

4th International Symposium: Multiple Risk Factors in Cardiovascular Disease, Washington, DC. *Information*: Giovanni Lorenzini Medical Foundation, 6550 Fannin, Suite 1287, Houston, TX 77030-2720. Tel: 713-797-0401; fax: 713-796-8853; e-mail: ajackson@bcm.tmc.edu.

May 16-21

1997 International Conference, San Francisco, CA. *Information*: American Lung Association/American Thoracic Society, 1740 Broadway, New York, NY 10019-4374.

May 31-June 3

Applied Ethics in Animal Research: From Theory to Decision-Making, Albuquerque, NM. *Information*: John P. Gluck, Department of Psychology, University of New Mexico, Albuquerque, NM 87131. Tel: 505-277-3420; fax: 505-277-1394; e-mail: jgluck@unm.edu.

May 31-June 5

11th Annual Human Anatomy & Physiology Society Conference, Toronto, Ontario, Canada. *Information*: Henry Ruschin, Humber College, 205 Humber College Blvd., Etobicoke, Ontario, Canada M9W 5L7. Tel: 416-675-6622; fax: 416-675-2015; e-mail: ruschin @admin.humberc.on.ca.

May 16-18

5th International Congress on Physical Education and Sport, Komotini, Greece. *Information*: Savvas Tokmakidis, Department of Physical Education and Sport Science, Democritus University of Thrace, Komotini, 69100, Greece. Tel: 30-531-21764; fax: 30-531-33582.

June 2-6

24th Annual Meeting of the International Society for the Study of the Lumbar Spine, Singapore. *Information*: Edward Hanley, ISSLS, Sunnybrook Medical Centre, 2075 Bayview Avenue, Toronto, Canada M4N 3M5. Tel: 416-480-4833; fax: 416-480-6055.

June 7-11

Third Annual Workshop on Teaching Survival Skills and Ethics to Emerging Researchers, Wheeling, WV. *Information*: The Survival Skills and Ethics Program, University of Pittsburgh, 4K26 Forbes Quadrangle, Pittsburgh, PA 15260. Tel: 412-624-7098; e-mail: survival+@pitt.edu.

July 8-12

Symposium on Thermal Physiology, Copenhagen, Denmark. *Information*: Thermal Symposium '97, c/o DIS Congress Service, Herlev Ringvej 2C, DK-2730 Herlev, Denmark. Tel: 45-449-24492; fax: 45-449-25050.

July 17-19

International Potassium Channel Conference, Ulm, Germany. *Information*: Christiane Siemer, Department of Applied Physiology, University of Ulm, Albert Einstein Allee 11, 89081 Ulm, Germany. Tel: 49-731-502-3889; fax: 49-731-502-3260; Internet: http://www.uni-ulm.de/uni/fak/medizin/grissmer/ipcc/ipcc.htm.

July 27-August 1

16th International Congress of Nutrition, Montreal, Canada. *Information*: Congress Secretariat, IUNS 97, National Research Council Canada, Building M-19, Montreal Road, Ottawa, ON, Canada K1A 0R6. Tel: 613-993-7271; fax: 613-993-7250.

August 2-4

2nd World Conference of the International Society for Molecular Nutrition and Therapy, Winnipeg, Manitoba, Canada. *Information:* Grant N. Pierce, St. Boniface Hospital Research Centre, 351 Tache Ave., Winnipeg, Manitoba, Canada R2H 2A6. Tel: 204-235-3414; fax: 204-233-6723; e-mail: pierce@sbrc.umanitoba.ca.

August 11-15

Advances in Tissue Engineering, Houston, TX. *Information*: Rice University School of Continuing Studies, 6100 Main Street, Houston, TX 77005-1892. Tel: 713-520-6022; fax: 713-285-5213; e-mail: scs@rice.edu; Internet: http://www.rice.edu/scs/tissue.