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Complete EB '99 Program See Pages 27-38





APS Council Meets p. 5

Ethan Nadel 1941-1998 p. 7

Introducing 3 New APS Committee Chairs p. 16

Call to Activism Symposium p. 34

The Physiologist

Volume 42, Number 1

February 1999

FASEB Federal Funding Consensus Conference FY 2000 Executive Summary

We are in the midst of a tremendous period of discovery in the life sciences and stand on the threshold of even more profound advances in knowledge. The nation looks to the future with hope and anticipation of the new improvements in health, standard of living, and quality of life that these discoveries will bring. American citizens and their elected representatives understand that this nation's progress and prosperity are dependent on our advancements in science, and in a clear and consistent voice they have called for a "doubling" of our federal investment in research to accelerate our growth. Last year, our nation's leaders provided historic increases for life sciences research as a first step toward this goal.

In the context of this commitment to increase the investment in our nation's future, the Societies for Federation of American Experimental Biology (FASEB)-the world's largest organization of biomedical scientists consisting of 17 member societies representing over 56,000 researchers-offers its recommendation for biomedical and life sciences research for the next fiscal year. Each year, representatives of the FASEB societies convene to discuss research opportunities in the life sciences and review the accomplishments of biomedical research programs supported by the federal government. This report summarizes their review and their recommendations for federal support for FY 2000.

To view the full text of the report, go to http://www.faseb.org.

National Institutes of Health

To meet the emerging opportunities and needs in basic biomedical research, clinical research, and biomedical science infrastructure, and to promote novel interdisciplinary programs, FASEB recommends an additional \$2.3 billion, a 15% increase, for NIH in FY 2000. This growth is consistent with the broadly supported goal of doubling the NIH budget in five years.

FASEB supports the continued reliance on scientific opportunity as the principal determinant of NIH research and training programs.

FASEB also supports efforts of the NIH priority-setting process that includes consideration of disease burden and the inclusion of input from a broad spectrum of constituencies, including the general public and relevant patient, scientific, and medical communities.

FASEB encourages NIH to more effectively communicate its planning activities to Congress, the media, and the public.

FASEB encourages NIH to move forward with its planning efforts that relate to crosscutting issues. Specifically, NIH should address matters that are interdisciplinary and inter-institute in nature, and that span the extramural and intramural programs of the agency. Examples include training, infrastructure, and the adequacy of current funding mechanisms.

FASEB recommends increased support for high-quality, hypothesis-driven, patient-oriented research through conventional R01 and other investigator-initiated awards, and urges the appropriate involvement of physician-scientists in the review and selection process.

(continued on page 3)

The Physiologist

Volume 42 Number 1

February 1999

Contents

1

FASEB Federal Funding Consensus Conference FY 2000

|--|

APS News

Council Meets in San Antonio	5
ACDP Presents Distinguished	
Service Award to Norman Alpert	6
1998 Research Career Enhanceme	nt
Awards	6
Ethan Richard Nadel, 1941-1998	7
Alan Hodgkin, 1914-1998	9

Membership

New Regular Members10New Corresponding Members11New Affiliate Members12New Student Members12

Publications

Physiological Reviews14Introducing Dale Benos, APSPublications Committee Chair15

Committee News

Introducing Judith Neubauer,	APS
Program Committee Chair	16
Introducing Terry Opgenorth,	APS
Liaison With Industry	
Committee Chair	17

Public Affairs

President Will Propose Only a 2% Increase for NIH 4 NIH Expands Use of Modular Grant Application and Award 18 NIH Increases Stipend Levels for Some Awards 18 OMB to Require FOIA Release of Research Data 19

Hearings on Animal Extremism	20
USDA Proposal to Regulate Rats	20
Mice. and Birds Expected	20
NIGMS Report Tracks MSTP	
Graduates' Success	21
Experimental Biology '99	
Sections Special Functions	23
Distinguished Lectureships	24
Committee Meetings	26
Publications Special Functions	26
Experimental Biology '99	
Program	27
Public Affairs Sessions Planned	
for EB	35
Call to Activism Symposium	36
My Health, My World Outreach	25
Workshop	51
Announcements	
A DC Elections	20
APS Elections	38
Meetings and Conferences	38 5
Meetings and Conferences 1999 APS Conferences	38 5 39
Meetings and Conferences 1999 APS Conferences Positions Available	38 3 9 41
Meetings and Conferences 1999 APS Conferences Positions Available	38 3 9 41
Meetings and Conferences 1999 APS Conferences Positions Available People and Places Point Market Provide Apple Appl	38 39 41
 APS Elections Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf 	38 5 39 41
 APS Elections Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf Prize in Medicine 	38 5 39 41 48
 APS Elections Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf Prize in Medicine News From Senior 	38 5 39 41 48
APS Elections Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf Prize in Medicine News From Senior Physiologists	38 39 41 48 50
Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf Prize in Medicine News From Senior Physiologists Books Received	38 39 41 48 50 53
APS Elections Meetings and Conferences 1999 APS Conferences Positions Available People and Places Eric Kandel to Receive Wolf Prize in Medicine News From Senior Physiologists Books Received Book Reviews	 38 39 41 48 50 53 54

and Congresses

57

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Please notify the central office as soon as possible if you change your address or telephone number.

Headquarters phone: 301-530-7118. Fax: 301-571-8305. http://www.faseb.org/aps/

FASEB Executive Summary

FASEB recommends that NIH establish an Institutional Infrastructure Support Grant, funded at the level of 2% of the total Research Project Grants at a given institution. These funds should be used for shared equipment, infrastructure, bridge funds, and oneyear pilot projects. This program should be administered locally with appropriate NIH oversight. All such funds should be distributed according to a rigorous, local scientific merit review mechanism.

FASEB recommends that funding for the shared biomedical technology resources program (P41) be increased from its current level of \$67 million to \$167 million in FY 2000.

FASEB supports NIH's ongoing study of ways to reduce the unnecessary burden that federal regulations impose on researchers. We hope that the recommendations of the study received widespread consideration.

National Science Foundation

FASEB recommends that NSF receive \$4.2 billion in FY 2000, representing a 15% increase over last year's funding levels.

FASEB recommends that NSF devote most of its new resources for FY 2000 to increasing the size and length of its grants.

US Department of Agriculture

FASEB recommends increasing the base funding for the National Research

Initiative Competitive Grants Program by \$33 million to \$152 million in FY 2000, as well as establishing a new agricultural genomics program and restoring full funding for the education efforts of the National Needs Initiative.

FASEB recommends the creation of a new agricultural genomics program with genomics and proteomics components that focus on agriculturally important organisms. We recommend that this agricultural genomics initiative be funded with \$50 million from the Initiative for Future Agriculture and Food Systems, which has genomics as a priority mission area. FASEB further recommends that this program be coordinated with other USDA activities and with those at he NSF, DOE, NIH, and in the private sector.

US Department of Energy

FASEB recommends that the core research budget for Biological and Environmental Research and Basic Energy Sciences be increased by \$100 million for a total of \$1.3 billion. The Basic Energy Sciences budget for the facilities program should be increased by \$45 million to \$216 million in order to ensure the optimal use of these critical national resources.

FASEB applauds the cooperative efforts of funding agencies to set and achieve common goals for the synchrotron facilities including the sharing of costs of major upgrades and operation of associated beam lines. Ultimately, these actions will ensure maximization of the use of these facilities and enable them to serve a growing demand in biomedical research.

US Department of Veterans Affairs

To meet new opportunities and better respond to the health needs of veterans, FASEB recommends that the VA research and development budget be increased by \$44 million for a total of at least \$360 million in FY 2000.

FASEB recommends that excess medical facility space be converted into research space and existing research space be upgraded.

National Aeronautics and Space Administration

FASEB recommends that the Life Sciences Division R&A budget be increased by \$50 million to \$125 million in FY 2000.

FASEB recommends that NASA implement the findings and recommendations of the Ad Hoc Task Force on Peer Review in order to further solidify the ongoing transformation of its peer review process.

FASEB supports the strategies outlines by NASA for providing oversight and funding of the NSBRI (National Space Biomedical Research Institute), while at the same time expanding its commitment of resources to the (Life Sciences Division) R&A program.

For President's proposal on NIH budget, see article on page 4.



President Will Propose Only A 2% Increase for NIH

President Clinton will propose only a 2% increase for the NIH in FY 2000, according to the documents released at the time of the January 19 State of the Union address. This is far less than the 15% increase recommended by the FASEB Consensus Conference to keep NIH on the path to a five-year doubling of its budget. The \$320 million increase would bring NIH's FY 2000 funding level to \$15.652 billion. The budget proposal will be formally submitted to Congress on February 1.

Although the President's recommendation is disappointing, it must be viewed in context. First of all, it is only the opening gambit in the lengthy budget and appropriations procedure. The administration formulated its comprehensive package of funding recommendations using the strict spending limits imposed by an earlier budget agreement. This left little room for increases, particularly since some of the funds available for FY 2000 under the budget agreement were spent for FY 1999 programs when Congress voted increases to virtually anyone who asked as a way to hasten its adjournment. Office of Management and Budget Director Jacob Lew signaled the President's intentions by telling science supporters that increases in domestic discretionary programs would be a lower priority in the FY 2000 budget than how to address the problems of the social security system.

Furthermore, recommendations for minimal NIH budget increases by the administration have become standard fare in recent years. Congress has been NIH's champion so both Democratic and Republican administrations have tended to submit relatively low increase proposals, knowing that Congress would supplement them.

Of greater concern are the rumblings around town asking whether NIH can put another large increase to use. Many on Capitol Hill are already promising closer scrutiny this year as NIH decides how to spend the \$2 billion increase provided for FY 1999. ❖

For more Public Affairs articles, see page 18.

APS News

Council Meets in San Antonio

The APS fall Council meeting was held in San Antonio, Texas, at the Plaza San Antonio on December 3-6, 1998. The Council meeting was held prior to the APS Fall Conference "The Paraventricular Nucleus of the Hypothalamus: Crossroads of Integrative Physiology" organized by J. R. Haywood and held on December 5-9 at the historic Menger Hotel.

During the meeting, Council accepted the final 1998 budget and the proposed 1999 budget. Plans were finalized for a strategic-planning retreat to be held on November 14-16, 1999. At this retreat, Council, the Long-Range Planning Committee, and the section chairs will review the current APS Strategic Plan and to discuss innovative ideas and programs the Society could implement in the coming century. Because of the strength of the stock market and the ability of the Society's money managers, APS is in a very strong financial situation. Council again voiced its desire to see more of the Society's funds being used for memberbenefit programs. Consequently, Council unanimously approved the recommendation of the Publications and Finance Committees to offer free color to members who are first or last author on any manuscript published in any of the Society's journals.

The offer of free color to members was seen by Council as one means by which to attract new members. President L. Gabriel Navar's membership campaign of 10,000 members by the year 2000 continues to gather momentum. A total of 167 new members were approved by Council at this meeting, bringing APS membership to 8,877 with more than a year to go. Increased member benefits, such as the free color offer. the APS Online Journal Collection for \$49.50, access to AAAS' ScienceNow and Science's Next Wave. and the possible bylaw change transferring all corresponding members to regular membership (to be voted on at the Society's Business Meeting during the Experimental Biology meeting) should appeal to physiologists all over the world.

Council was presented with the newly published "Questions People Ask About Animals in Research," a joint project of the Animal Care and Experimentation and Public Affairs Committees. The color brochure is aimed at school children and seeks to provide answers to the commonly asked questions about the use of animals in research. Copies of the brochure are available free to members.

Other business attended to by Council included a discussion on the issue of age qualification for the Henry Pickering Bowditch Award Lectureship. Currently the age limit for consideration for the award is 40 years of age. The Awards Committee recommended to Council that the age limit be raised to 45 years of age because of the increased length of time it takes for young people to attain their first tenure-track position. After much discussion, Council agreed to raise the age limit for the Bowditch award to 42 years of age instead of the recommended 45 years.

This particular meeting was highlighted by the Council meeting jointly with the Association of Chairs of Departments of Physiology (ACDP). The last meeting of these two organizations two years ago was seen as an unqualified success in terms of initiation of joint projects of mutual interest. These included the yearly employment survey of recent graduates in physiology and the development of a core competency curriculum for physiology. Work on those projects remains ongoing. At this joint meeting, Council and ACDP were brought up-to-date on those projects and discussions were held regarding future potential joint projects. In addition, APS member Norman R. Alpert was honored at a luncheon where he was presented with the ACDP's Distinguished Service Award (see p. 6). Again, the meeting was viewed as highly successful and served to reemphasize the common goals of the two organizations.

Additional details of the Council's actions during the December meeting will be communicated to the membership at the spring Business Meeting and in *The Physiologist.*



APS Council.



L. Gabriel Navar and Martin Frank contend with the "bull" at the joint APS and ACDP meeting.

ACDP Presents Distinguished Service Award to Norman Alpert

At the recent meeting of the Association of Chairs of Departments of Physiology (ACDP) held December 4-6, 1998, in San Antonio, Texas, the association's annual Distinguished Service Award was presented to Norman R. Alpert.

Alpert began his career at Columbia University as an assistant and instructor in physiology. He was appointed Assistant Professor in the Department of Physiology at the University of Illinois in 1953 and was promoted to

Associate Professor in 1958 and full Professor in 1965. At the University of Illinois, Alpert's name remains above the door to his old office, signifying his status in that department. He was then recruited to be the Chair of the Department of Molecular Physiology and Biophysics at the University of Vermont in 1966. He retained that position until 1995 when he stepped down as chair.

Alpert maintains membership and is active in a number ing APS, Biophysical Soci- the Distinguished Service Award.

ety, Harvey Society, Society of General Physiology, American Heart Association, and Cardiac Muscle Society. He has served editor, associate editor, or on the editorial board of numerous journals, including Journal of Molecular and Cellular Cardiology; American Journal of Physiology: Heart and Circulatory Physiology; Coronary Heart Disease; Circulation Research; Clinical Cardiology; Cardioscience; Heart. News and Views: and Trends of Cardiovascular Medicine.



of scientific societies, includ- ACDP President Mordecai Blaustein (right) presents Norman Alpert with

Among the awards Alpert has received in addition to the ACDP Distinguished Service Award are the Wiggers Award presented by the APS Cardiovascular Section, the University Scholar Award in the Medical Sciences. and election to the Vermont Academy of Science and Engineering.

In presenting the award to him, ACDP President Mordecai P. Blaustein remarked that when Alpert served as Chair of the Department of Molecular Physiology and Biophysics at the

University of Vermont, he was viewed as a role model for his faculty. He worked to build the department into an international center of excellence in cardiovascular and muscle physiology. Alpert was able to create an environment that made science enjoyable and allowed individuals to perform to their maximum potential. He was constantly encouraging his faculty to take on new challenges and opportunities. Consequently, former faculty praised Alpert for his fine values, sincerity, and his desire to bolster his colleagues above himself. 🚸

1998 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 1998 the fall round of applications resulted in 3 of 4 applications being accepted, those of Lawrence E. Cornett, Tara L. Haas, and Rodrigo Iturriaga.

Lawrence E. Cornett, University of Arkansas for Medical Sciences, will use the award to visit the laboratory of James S. Norris at the Medical University of South Carolina to learn practical aspects of adeno-associated virus biology.

The award to Tara L. Haas, Yale University will enable her to learn and implement the surgical and experimental techniques involved in chronic electrical stimulation of rat hindlimb muscles in the laboratory of Olga Hudlická, University of Birmingham School of Medicine in Birmingham, UK.

Rodrigo Catholic Iturriaga, University of Chile in Santiago, will visit the laboratory of Machiko Shirahata, Johns Hopkins University, to acquire new scientific skills and training in methodologies appropriate for implementing new techniques.

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

Obituary

Ethan Richard Nadel, 1941-1998

Ethan R. Nadel, Director of The John B. Pierce Laboratory and Professor of Epidemiology & Public Health and of Cellular & Molecular Physiology at the Yale University School of Medicine in New Haven, CT, died at his home in Guilford, CT on December 26, 1998 after a protracted illness brought on by cancer.

Nadel was the son of Ruth G. Nadel of Washington, DC and the late Aaron B. Nadel. He is survived by his wife Emilia Bergamasco and two daughters, Dana Foley of New York City, NY and Maya Bergamasco of Guilford, CT as well as his brothers, John B. and Roger S. Nadel, both of Los Angeles, CA and Gordon L. Nadel of Jasper, OR.

Born on September 3, 1941, Nadel grew up in the Washington, DC area. After attending high school in Maryland, he went on to Williams College in Massachusetts, where he graduated in Biological Sciences in 1963. After his graduation, he moved to the University of California where he studied environmental physiology under Steven M. Horvath at the Institute for Environmental Stress in Santa Barbara. Thus, began his life-long interest in human thermoregulation. As a graduate student, Nadel investigated the interactions between peripheral and central thermoreception in the control of heat production and heat loss mechanisms in humans. He subsequently received his PhD in 1969.

Nadel then undertook postdoctoral studies as an NIH Fellow at the John B. Pierce Laboratory in New Haven, CT, where he continued to work on temperature regulation with Jan Stolwijk and the late James D. Hardy, who was the Director of the Pierce Laboratory at that time. During his first year there, he studied sweating mechanisms with the late Bob Bullard, who was spending a sabbatical at the Pierce Laboratory. Nadel then developed a deeper interest in the problems of thermoregulation associated with exercise and heat exposure, which led him to recognize the pivotal role played by the blood volume in the ability of the body to successfully acclimate to thermal stresses. Investigation of the factors that control plasma volume in humans then became one of the major focuses of his research career.

Nadel was first appointed an Assistant Fellow of the Pierce



Ethan R. Nadel

Laboratory and an Assistant Professor at Yale University School of Medicine in 1970. He rose through the ranks of both the Pierce Laboratory and Yale University to become a Fellow of the Laboratory and a Professor of Epidemiology and of Physiology in 1985. He was also a Fellow of Trumbull College within Yale College at New Haven. During this time, he was actively involved in both teaching and research at the Pierce Laboratory and in the Medical School and the Graduate School at Yale. He established a number of postdoctoral networks with several laboratories in Europe, Japan, and the US, as well as supervising several Yale medical and graduate students in their doctoral theses. He also spent several fruitful sabbaticals, working in laboratories in France, Sweden, Australia, and Japan.

He was appointed Director of the Pierce Laboratory in 1989. During his tenure from 1989 to 1998, he planned and oversaw an expansion and major renovations of the Laboratory's facilities and the research staff grew to 25 scientists and postdoctoral fellows. He strengthened the relationship between the Pierce Laboratory and Yale Medical School. Many medical students and graduate students completed significant portions of their training at the Pierce Laboratory using its facilities, while under the supervision of Nadel and other Laboratory staff who are on the Yale faculty. He also developed a close relationship with the Noll Laboratory at Pennsylvania State University, leading to a profitable interchange of ideas and personnel between the two laboratories, that still continues today.

Nadel was an authority in the area of human thermoregulation during exercise and heat exposure. He spent much of his research career studying the mechanisms by which people attain physical fitness through exercise training and become acclimatized to heat exposure. He was particularly interested in the factors that govern the regulation of plasma volume and their effects on physical performance and heat tolerance.

When aeronautical engineers at Massachusetts Institute of Technology were designing a man-powered aircraft that would break all existing flight endurance records, they were frustrated by the lack of information on how to provide the "human engine" with the resources necessary to power their plane. They turned to Nadel for information about the limits and optimization of human exercise performance. He joined their team and helped develop the methods of human testing, exercise training, body cooling, and body fluid, electrolyte, and carbohydrate replacement, without which the actual flight

Obituary

would not have been successful. Working closely together, an aeronautical team from MIT headed by Steven Bussolari and a team of exercise physiologists led by Nadel solved the problems of sustained man-powered flight. The plane took off on April 23, 1989, from the Island of Crete, recreating the Greek mythological flight of Daedalus and his son Icarus from King Minos of Crete to the nearby Island of Thera (now known as Santorini), a distance of 119 kilometers. The plane was pedalpowered by the Greek cycling champion Kanellos. He successfully made the necessary four-hour flight to land on Santorini, thereby establishing a new world record for human-powered flight.

Nadel also had an interest in the problems of physical fitness and aging. For many years he ran an NIH-funded study in conjunction with the Heritage Village, a retirement community in Southbury, CT, documenting patterns of fitness and exercise among the elderly. The study also tried to develop suitable methods of training for the elderly that would be successful in preventing or minimizing the progression to immobility and cardiovascular and orthopedic injuries that often afflict many of our older citizens.

Nadel was a member of the APS, a Fellow of the American College of

Sports Medicine (ACSM) and a member of the Sigma Xi Society and the American Association for the Advancement of Science. He served on the Board of Trustees of the ACSM from 1982-85 and was also a scientific consultant to the Gatorade Division of Quaker Oats Company. Among his numerous awards and recognitions, Nadel was a Fellow of the Japanese Society for the Promotion of Science, a National Lecturer for the Sigma Xi Society, the Harry G. Armstrong Lecturer for the Aerospace Medical Association in 1991, and was to be the APS Edward F. Adolph Distinguished Lecturer at the Experimental Biology meeting in April 1999. He was also to receive a Citation Award from the ACSM at its annual meeting in June 1999. He was an author on over 140 scientific papers and edited three monographs on exercise and thermoregulation. He served also on the Editorial Boards of several journals for both the APS and ACSM and was a scientific reviewer for NIH.

During the past 20 years, Ethan performed yeoman service in many capacities for the APS. Starting in the mid-1970s, he was the familiar and long-suffering unofficial organizer of the APS Temperature Regulation Dinner, a position that he inherited from his former mentor Steve Horvath. When the Society was sectionalized in 1978, he served on the task force that set up the Environmental and Exercise Physiology Section and went on to serve as Councilor, Program Committee Representative, and later Chairman for the EEP Section. He also served on several APS committees, which included the Long-Range Planning Committee, the Nominating Committee, and most recently, the Program Committee, of which he was Chairman from 1995 to 1998, serving as an ex officio member of the APS Council since 1995. In 1998, he was elected to a 3-year term as an APS Councillor. The Society owes Nadel a great debt for his diligent and tireless service over the years and his efforts will be sorely missed in the future. Those who have known him, as colleagues, students, or friends could not help but be infected with his indomitable spirit and his enthusiasm for science and education and they will carry those ideals forward. 💠

> John B. Stitt John B. Pierce Laboratories New Haven, CT

Memorial contributions may be made in Ethan Nadel's name to The Women and Family Life Center, 89 State Street, Guilford, CT 06437.



Obituary

Alan Hodgkin, 1914-1998

Sir Alan Lloyd Hodgkin, an APS honorary member and Nobel Prize winner, died December 20, 1998, in Cambridge, UK, at the age of 84.

Hodgkin began his studies in physiology, chemistry, and zoology at Trinity College in Cambridge, UK in 1932 and was soon elected to the Undergraduate Natural Science Club.

After one year, he was elected as a Fellow of Trinity after experimenting on cold block in frog nerves, which Hodgkin described as "rather amateur" work.

In 1939, Hodgkin joined Andrew Huxley at the Laboratory of the Marine Biological Association in Plymouth. Initially, the researchers wanted to determine the amounts and locations of electrical charges inside the shafts of individual nerve cells while messages were actually being transmitted. They discovered that at its peak, the electric potential across the membrane of the squid axon did not just fall to zero, but was actually reversed. For this discovery on how nerves transmit information, Hodgkin and Huxley, along with Sir John Eccles of Australia, earned the 1963 Nobel Prize in physiology or medicine. Most of the group's research was performed on the nerve cell of the giant squid, which is about 40-50 times wider than comparable human fibers. In order to measure the electrical charges, they inserted wires and hollow tubing inside the narrow nerve fibers.

After the electrical information was obtained, Hodgkin used his intuitions about the behavior of cells, charges and currents to describe the action of the nerve cells in transmitting the data. It has been noted that Hodgkin's instinctive ability to decipher information was one of his greatest assets as a researcher, so much so that at times he was somewhat envied by fellow



Sir Alan Lloyd Hodgkin

researchers.

The results of these discoveries led to a new understanding of the electrical mechanisms of nervous system operations. Today's view of the way sense impressions are sent to the brain is based on Hodgkin's work with the axon of the giant squid's nerve cell.

As a result of these studies, Hodgkin also made one of his major discoveries, which was that an alternating flow of sodium and potassium ions into and out of nerve cells provides the electrical force that pushes messages through these cells to and from the brain.

Hodgkin was also credited with important research in other areas of bio-

physics and of nervous system operation, including sight and vision problems. Furthermore, Hodgkin's method for recording intracellular action potentials, "patch clamping," is now used universally for the measurement of potentials in every kind of cell.

During World War II, Hodgkin spent a few months working on aviation medicine, and then five years on the development of airborne radar. Out of this research came his most important contribution, the design of a 10 cm scanning and display system for night fighters.

Hodgkin later served as an assistant director of research in Cambridge's Physiological Laboratory until 1952 and from 1952 to 1969 as Foulerton Research Professor of the Royal Society. He was then appointed the John Humphrey Plummer Professor of Biophysics in the University but retained his laboratory in the Physiology Department.

In addition to his academic positions and winning the Nobel Prize, Hodgkin received many other honors. He served as Chancellor of the University of Leiceister from 1971-1984. He was elected a Fellow of the Royal Society in 1948, gave the Croonian Lecture in 1957, gave a Tercentenary Lecture in 1960, and was awarded a Royal Medal in 1958 and the Copley Medal in 1965. He was also appointed to the Order of Merit in 1973.

Hodgkin is survived by his wife, three daughters and a son. \diamondsuit

Deceased Members			
Jaime B. Coelho	Riverdale, NY	Kee C. Huang	Louisville, KY
Tihamer Z. Csaky	Fort Worth, TX	Ethan R. Nadel	New Haven, CT
Michael S. Dekin	New Brunswick, NJ	Guy Halliday Nelson	Richmond, VA
M.H.F. Friedman	Landsdowne, PA	S.K. Quadri	Manhattan, KS
Geza J. Hetenyi	Ottawa, Canada	Nathan Rakieten	Stony Brook, NY
Allan Lloyd Hodgkin	Cambridge, UK		

New Regular Members

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Jeffrey Lee Jasperse University of Missouri **Rodney Wayne Johnson** University of Illinois, Urbana Mathur Srinivasan Kannan University of Minnesota Hrayr S. Karaqueuzian Cedar Sinai Research Institute Manjo Lal Karwa Albert Einstein College of Medicine Edward L. Keller University of California, Berkeley Mearl A. Kilmore Univ. of Osteopathic Med., Des Moines **Glenn E. Kirsch** Case Western Reserve University **Barry R. Komisaruk** State University of New Jersey Sandor Janos Kovacs Washington Univ. School of Medicine Raymond K. Kudej Allegheny Univ. of Health Sciences Rhonda J. Kuykindoll Tennessee State University **Olivier Lesur** University of Sherbrooke **Gregory Allen Lnenicka** State University of New York, Albany Alex L. Loeb Cytometrics, Inc. **Dwight C. Look** Washington University Ken Lukowiak University of Calgary Nicole A. Lynch VA Medical Center, Baltimore William Winzer Lytton University of Wisconsin **Benedito Honorio Machado** University of Sao Paulo **Frederic Martini** University of Hawaii Hiroshi Mashimo VA Medical Center, West Roxbury Shirley A. McCormack University of Tennessee Nansie A. McHugh UMDNJ-R. W. Johnson Medical Ctr. **Robert C. McIntyre Jr.** Univ. of Colorado Health Science Ctr.

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New Student Members

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The Seventh Annual Women in Physiology Mentoring Program Luncheon

Sunday, April 18, 12:00 NOON to 1:30 PM Grand Hyatt, Lafayette/Farragut Squares

Featuring presentations by Program Staff at the National Institutes of Health and National Science Foundation

(Sponsored by the APS Women in Physiology Committee) For information and luncheon tickets, contact Andrea Jackson in the APS Education Office Tel: 301-571-0694; e-mail: ajackson@aps.faseb.org

Publications

Physiological Reviews

Physiological Reviews continues to provide the scientific community with broad, analytical, and comprehensive overviews of the highest quality. The journals Impact Factor is the highest in the field of physiology (19.33 in 1997 with a half-life of 8.5 years), and the journal is internationally renowned. This quality is maintained because of the dedication and hard work of the editors and board members

W. Boron, Editor, and G. H. Giebisch, Associate Editor, hold an annual meeting in the United States for the American Board that is made up of eight regular members and six representatives of other societies, as well as three corresponding members representing Australia/New Zealand, Latin America, and Japan. In June 1998, the American Board met in Mesquite, Nevada. Together with the European Committee, the journal is able to provide cross disciplinary coverage that spans the full range of physiology specialities and present the major work being performed in physiology laboratories all around the world.



Oxford meeting: Left to right: K.Sandvig (Norway), E. Carmeliat (Belgium), J., Lopez-Barneo (Spain), W. Boron (Editor, U.S.), U. Pohl (European Chairman, Germany), C. Weller (Assistant to European Editor), M.Jeannerod (France), B. Rauner (Publications Manager, APS), T. Clausen (Denmark), C. Boyd (U.K.), L. Strohmeier (Assistant to Editor). C.Bauer also attended the meeting.

The European Committee, under the Chairmanship of U.Pohl from Munich, Germany, meets once a year in Europe. The meeting is hosted in turn by members of a Committee that includes representatives from eight countries. In 1998



Mesquite meeting: Back Row: R. Aldrich, C. Hartzell, G. Giebisch, R. Nicholl, P. Gage, P. Pilch, U. Pohl, A. Noma, A. Cowley, J. Wright, Middle row: L. Strohmaier, B. Rauner, W. Visek, S. Hamilton, W. Chin. Front row: J.Lippincott-Schwartz, N. Rosenthal, W.Boron.

the Committee met in Oxford, in June, and the meeting was hosted by C.A.R. Boyd.

The Journal published a supplement with the January 1999 issue, "The Physiology of Cystic Fibrosis" (Guest Editor, Ray Frizzell), which is being offered for separate purchase.

At both the meetings in Oxford and Mesquite, the board members reviewed the status of all outstanding reviews, making decisions on whether deadlines should be extended or if an article should be considered "dead". The editor maintains a history of each invited manuscript on a centralized database, which is updated during the meetings. Not all authors honor their commitment and some only do so after a long delay, which makes the task of maintaining a steady flow of published manuscripts a real challenge. All board members bring 3-5 suggestions for new reviews and recommendations for authorship. Each board member is responsible for shepherding his/her assigned invitations through the review and revision process. 🚸

Committee News

Introducing Dale Benos, APS Publications Committee Chair

On January 1, 1999, **Dale J. Benos** succeeded **Leonard (Rusty) Johnson** as Chairman of the APS Publications Committee. Benos served as Editor of *AJP:Cell Physiology* for six years (1990-1996), Chairman of the Awards Committee for one year (1988), and was a member of the Publications Committee for two years (1995-1997) prior to election to the APS Council in 1997. As Chairman of the Publications Committee, Benos will also serve as Chairman of the Joint Managing Board of the APS and IUPS.

Benos received much of his training under two past presidents of the Physiological American Society. Studying under Bodil Schmidt-Nielsen, he earned a bachelor's degree in biology (1972) at Case Western Reserve University, Cleveland, Ohio. In 1976 he received his PhD degree from Duke University in the Department of Physiology and Pharmacology, where his thesis advisor was Daniel C. Tosteson. Following two years of postdoctoral study at Duke, Benos joined the faculty at Harvard Medical School, where he was assistant and associate professor and an Andrew W. Mellon Scholar. In 1985 he moved to the Department of Physiology and Biophysics at the University of Alabama at Birmingham. He was appointed chairman of that department in September 1996.

Benos directs an active laboratory that focuses on the biochemical, bio-



Dale Benos

physical, and molecular biological characterization of amiloride-sensitive Na⁺ channels that are present in the apical membranes of Na⁺-reabsorbing epithelia such as renal collecting tubules and alveolar epithelia, secretory epithelial Cl⁻ channels, including CFTR, whose regulation is compromised in cystic fibrosis, and voltage-independent K⁺ channels in mammalian astrocytes. In addition, his laboratory is studying the role of cytokines and gp120, the major envelope glycoprotein of the human immunodeficiency virus (HIV), on astrocyte ion and solute transport function, in the hope of evaluating potential mechanisms involved in the pathogenesis of HIV-associated cognitive/motor complex, a frequent manifestation of HIV infection. He has also worked on problems of salt and water transport in invertebrates and fish, investigated the cation transport properties of mammalian erythrocytes, preimplantation mammalian blastocytes and sperm, and studied the metabolic actions of antifertility agents in cultured cells and in vivo systems.

One of his major goals as Chairman of the Publications Committee will be to guide successfully the APS journals' transition from print to on-line publications, while at the same time enhancing the scientific stature of the publications program. He will take an active role in the recruitment of new journal editors and participate heavily in the anticipated launching of the newest APS journal, Physiological Genomics. Benos extends an open invitation to all society members to provide comments, criticisms, and suggestions as to the quality of the publications program and how the Society's publications may better serve the needs of the APS community.

Call for Nominations For the Editorship of American Journal of Physiology: Lung Cellular and Molecular Physiology

Nominations are invited for the editorship of the American Journal of Physiology: Lung Cellular and Molecular Physiology to succeed D. Eugene Rannels, Jr., who will complete his term as Editor on December 31, 1999. The Publications Committee plans to interview candidates in the Spring of 1999. Applications should be received by March 1, 1999. Nominations, accompanied by a curriculum vitae, should be sent to the Chair of the Publications Committee: Dr. Dale J. Benos Publications Department American Physiological Society 9650 Rockville Pike Bethesda, MD 20814-3991

Introducing Judith Neubauer, APS Program Committee Chair

Effective August 1998, Judith A. Neubauer succeeded Ethan Nadel as the chair of the APS Program Committee. Neubauer has served on the Program Committee for three years and has been actively involved with the process working toward reinvigorating the programming for the annual meeting.

Neubauer is an associate professor in the Department of Medicine with a joint appointment in Physiology at the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School in New Brunswick, NJ. She received her doctoral degree from Rutgers University in 1981 in the fields of respiratory and cardiovascular physiology. After a postdoctoral research experience, she accepted a faculty appointment at Robert Wood Johnson Medical School in 1983.

Neubauer's primary research focus has been on studying the effects of hypoxia on central respiratory neural control. Specifically, she has investigated the neural mechanisms responsible for the progression from hypoxic respiratory depression to hypoxic respiratory excitation (gasping). Her current research focus is directed at determining the cellular and molecular mechanisms involved in transducing the hypoxic signal into a excitatory or inhibitory response in respiratory and sympathetic neurons in primary culture.

Neubauer is very enthusiastic about the Experimental Biology (EB) program, especially in light of the recent changes in the EB program that have recently been implemented. The program changes have been evolving over the past few years, thanks to efforts initiated under the leadership of Ethan Nadel, in conjunction with the Society's leadership, including a Blue Ribbon Panel called together by Allen Cowley. These changes will allow the individual APS sections to have more responsibility for developing the scientific meeting. The intention of these changes is to



Judith Neubauer

empower the membership and allow sections the opportunity to create meetings within the EB meeting highlighting the best and hottest science in their area. As a result of the recommendations, each section has created a Section Program Committee that is responsible for developing a designated number of symposia. In addition, the Section Program Committee is responsible for seeding "featured topics," a new mechanism that has been developed to solicit abstracts from the membership around a highlighted keynote speaker in an emergent hot topic in the field. Other program changes have been implemented to facilitate scientific exchange at the meeting including posters unopposed by oral sessions, situating the posters among the exhibits and establishing "On-The-Floor" Poster Discussion sessions as a means to cluster posters and foster active discussion around coordinated topics. Other features of the EB meeting include the Distinguished Lectureships, the Bowditch and Cannon Lectureships, and the Physiology InFocus program. The Physiology InFocus program at EB '99 organized by APS President Gabriel Navar and Victor Dzau will feature four sessions around the theme of "Genomics and Molecular Medicine." In addition, the Society will also hold the first annual Walter C. Randall Lectureship in Biomedical Ethics which will be presented by Frank Young, the former Commissioner of the Food and Drug Administration. Neubauer feels that the changes in the programming process will enable the sections to work with the Program Committee to ensure a high quality and exciting EB meeting. She encourages the members to contact their Section Program Committee members with ideas for symposia and "featured topics." A list of the members of the Section Program Committee are available on the Web at http://www.faseb.org/aps/committee/ members/program.htm. 💠

Call for 2001 APS Conference Topics

Information on submitting conference proposals can be found on the web at http://www.faseb.org/aps/proposal.htm, or you can contact the APS Membership Services Department at 301-530-7171.

DEADLINE: February 15, 1999

Committee News

Introducing Terry Opgenorth, APS Liaison With Industry Committee Chair

On January 1, 1999, Terry J. Opgenorth succeeded Ann Seymour as Chair of the APS Liaison With Industry Committee. Opgenorth previously served as a member of the Liaison With Industry Committee for three years. Opgenorth will be an ex officio member of the APS Public Affairs and Animal Care and Experimentation Committees.

Established in 1981, the responsibilities of the Liaison With Industry Committee are to foster interactions and improve relations between the Society and industry by discussing problems of mutual concern; develop new ways that the Society and related industry can interact in mutually beneficial ways; designate a member(s) of the committee to serve on the Public Affairs and the Animal Care and Experimentation Committees as ex officio members, without vote; develop a program to encourage high school and college students, especially minorities, to choose a career in physiology in cooperation with the Career Opportunities in Physiology Committee; recruit membership from industry.

A major focus of the Committee's effort over the past few years has been to develop ways of enhancing the participation of APS members from indus-



Terry Opgenorth try on Society committees, journal editorial boards, symposia planning, etc. with an anticipated effect of attracting additional members from industry. In addition, the Liaison With Industry Committee has been a strong supporter of both the Education and Career Committees' efforts to develop materials to foster interest in Physiology as a career.

Opgenorth is Divisional Vice President of Metabolic Disease Research in Abbott Laboratories, Pharmaceutical Products Division. He graduated from Calvin College in Grand Rapids, MI and the University of Illinois, where he received his PhD in 1982 under the mentorship of John E. Zehr. He undertook postdoctoral research at the Mayo Clinic with J. Carlos Romero and John C. Burnett, Jr. and spent two years as an Assistant Professor at the Charles Drew University of Medicine and Science in Los Angeles, CA prior to joining Abbott in 1987 as a Sr. Scientist. His research has mainly focused on cardiorenal aspects of hormones and factors effecting vascular function.

The current challenge before the Liaison With Industry Committee is to determine whether a standing committee is necessary to carry out the needs of the Society that relate to industry and to consider a revision of its charter to better facilitate productive interactions between the Society and industry. Your input into either of these two issues, or any other matter relating to the work of this Committee, is highly desired and should be directed to Opgenorth prior to the EB **'**99 meeting (email: terry.opgenorth@abbott.com). *

Moving?

If you have moved or changed your phone, fax, or email address,

please notify the APS Membership Office at 301-530-7171 or fax to 301-571-8313.

NIH Expands Use of Modular Grant Application and Award

NIH recently announced it is expanding the use of the Modular Grant Application and Award for grant applications with total costs of \$250,000 a year or less.

In the past, application packets required separate and detailed budget categories. The revised process, which applies to all unsolicited new, revised and competing continuation R01, R03, R15, R21, R41, and R43 grants and competing supplements, as well as applications responding to Requests for Applications (RFAs), involves requesting direct costs in \$25,000 increments, or modules.

The Modular Grant Initiative expands the existing streamlining and initiatives

that are designed to concentrate the focus of investigators, their respective institutions, peer reviewers, and NIH staff on the science NIH supports, rather than on the detail of budgets. Through modifying the procedure, the Modular Grant Application will help address the broader NIH goal of reducing the length of time between application receipt and grant award.

Beginning with the June 1, 1999 receipt date, the modular grant application procedures will apply to <u>all</u> competing research project grants (R01), small grants (R03), and exploratory/developmental grants (R21).

In addition to requesting direct costs in \$25,000 modules, up to a total direct cost request of \$250,000 per year, the modular grant application includes the following other features:

• A typical Modular Grant Application will request the same number of modules in each year. There will be no routine escalation for future years.

• Application budgets will be simplified.

The first full year for implementation of the revised application will be a period for comment, review and feedback, and A formal assessment of the process will follow. For more information, visit NIH's grants web page at http://www. nih.gov/grants/guide/notice-files/not98-178.html.

British Activist Ends Hunger Strike

British animal rights activist Barry Horne ended a 68-day hunger strike on December 14, 1998 after а Parliamentary committee agreed to look into the matter of "vivisection," according to news reports. This gesture was seen as falling short of Horne's original demand that the government conduct a full-scale inquiry into the use of animals in medical testing. Animal rights activists nevertheless counted the move as a victory because Horne's hunger strike had brought new focus to the

issue. The 46-year-old Horne is serving an 18-year prison sentence for acts of arson. This was his third hunger strike since going to prison.

Significant controversy surrounded Horne's hunger strike. Toward the end, his supporters claimed that he was on the verge of slipping into a coma and had already gone blind and suffered irreparable liver damage. At around this time, some animal activists issued threats that prominent individuals associated with animal research would be killed if Horne succumbed. However, doctors said that Horne had not suffered irreversible damage to his health, and his supporters were ultimately forced to admit that he had taken orange juice and sugared tea on several occasions during his hunger strike. Other news reports claimed that Horne ended his strike because he objected to being cast in the role of martyr for the cause of animal rights.

NIH Increases Stipend Levels for Some Awards

NIH has increased the stipend level for all individuals receiving institutional or individual National Research Service Awards (NRSA) training awards on or after October 1, 1998. Stipends for grants awarded under the Minority Access to Research Career (MARC) and Career Opportunities in Research (COR) programs are also being increased to \$6,780 for freshmen and sophomores, \$9,492 for juniors and seniors, and \$14,688 for predoctoral students. The new stipends are effective only for awards made with FY 1999 funds. Adjustments or supplements of NRSA funded stipends for awards made prior to October 1, 1998, are not permitted. NIH asks that the new stipend levels be used in the preparation of future competing and non-competing NRSA institutional training grant and individual fellowship applications. The stipend increase will be applied to all applications now in the review process. For more information go to http://www.nih. gov/grants/guide/notice-files/not98-161.html. �

Table 1. New Stipend Levels for NIH awards

Years Postdoctoral Experience	Stipend
0	\$26,256
1	\$27,720
2	\$32,700
3	\$34,368
4	\$36,036
5	\$37,680
6	\$39,348
7 or more	\$41,268

OMB to Issue Rule Requiring FOIA Release of Research Data

The federal Office of Management and Budget (OMB) was expected to issue a Notice of Proposed Rulemaking by early February to establish a procedure for the public to gain access to federally funded research data under the Freedom of Information Act (FOIA). This prospect created enormous concern in the academic community over the problems this would create for federally funded researchers and the agencies that sponsor their work.

The need to establish a provision for FOIA release of research data was mandated in a provision that was quietly included in the omnibus appropriations bill that was passed in the closing days of the 105th Congress. The provision, inserted by Sen. Richard Shelby (R-AL), gave the OMB until the end of this fiscal year (September 30, 1999) to revise its Circular A-110 to provide for public access to research data. This action was taken to settle a long-running dispute with the Environmental Protection Agency, which had refused to release to the coal industry the scientific data used to justify air pollution regulations. However, the way the law was written, it applies to all federally funded research data, not only the data used to justify regulatory actions.

Once the existence of this provision became known, concerns were raised about the problems it might cause. Reps. George Brown (D-CA) and John Porter (R-IL) wrote a letter to OMB Director Jacob Lew late last year, pointing out the potential unintended consequences of FOIA release of research data. Brown, the Ranking Democrat on the House Science Committee, also introduced a bill in the 106th Congress to repeal the provision. However, since legislation typically does not move quickly at the opening of a new Congress, this remedy most likely will not become available soon enough to forestall the rule-making process.

NIH Deputy Director for Extramural Research Wendy Baldwin has been one of those who has raised concerns about FOIA release of research data and has spoken out about it on numerous occasions to bring it to the attention of the extramural community. She told one audience that the federally funded researchers should respond quickly and thoroughly to the regulatory proposal upon its release so that OMB can be alerted to its potential consequences.

Baldwin said that the rule-making process will need to address a wide range of issues, such as how should "data" be defined and when should data be made available. Subsequent information seemed to indicate that publication would be considered as the event to trigger data release requirements, but even so that will leave unsettled other issues Baldwin had raised, e.g., what constitutes "publication," and does the publication of one portion of the researcher's data make the entire data set subject to release. Also, if the government provided only a portion of the project's funding, will the public be entitled to disclosure of all project data? How will the existing FOIA exemptions for "predecisional" materials and confidential information be interpreted with respect to research data? The latter will be particularly important because of the confidential information collected for clinical trials. In addition, will the regulations make provisions to prevent participants in clinical trials from identifying what treatment they are receiving? Also, how will grantees be reimbursed for the costs of preparing data for public release? Will there be protections against the use of repeated and burdensome FOIA requests as a method of harassing federal agencies and individual researchers?

The APS Public Affairs Office is gathering information about these issues while awaiting publication of the Notice of Proposed Rulemaking. Individual researchers also have the option of submitting comments on their own behalf. For further information about the proposed rule when it becomes available, please contact Public Affairs Officer Alice Ra'anan at araanan@aps.faseb.org.

New Article in FASEB's Breakthroughs in Bioscience Series

When scientists identified *Helicobacter pylor*i as the infectious agent responsible for the peptic ulcer disease, it completely transformed our understanding of the microbiology and pathology of the human stomach. The story of the discovery of this microorganism reads like a chapter taken from Microbe Hunters and is the topic of another in a series of articles published by FASEB in the Breakthroughs in

Bioscience Series. The article, "*Helicobacter pylori* and Ulcers: A Paradigm Revised by N.A. Lynch," is available through FASEB's Office of Public Affairs (9650 Rockville Pike, Bethesda, MD 20814; 301-571-0657). The entire series of articles may also be viewed on the FASEB Public Affairs web site at http://www.faseb.org/opar/opar.html.

NAIA to Petition Congress for Hearings on Animal Extremism

The APS Council voted in December to sign a petition being circulated electronically by National Animal Interest Alliance (NAIA). The petition calls upon the Senate Judiciary Committee to hold hearings into "the consequences of animal rights terrorism in the nation and internationally."

NAIA is a self-described "association of business, agricultural, scientific, and recreational interest[s] formed to protect and promote humane practices and relationships between people and animals." NAIA further describes itself as providing "the network, expertise, and leadership necessary for diverse groups to communicate with one another, to describe the nature and value of their work, to clarify animal rights misinformation, and to educate each other and the public about what they do and how they do it." The current President of NAIA is Adrian R. Morrison, DVM, PhD. a Professor of Behavioral

Neuroscience at the School of Veterinary Medicine of the University of Pennsylvania, Philadelphia.

The NAIA petition is written in the form of a resolution. One of its clauses notes that "Whereas, many animal rights extremist organizations and individuals are engaging in conspiracy that has directly resulted in increased violence against individuals, businesses, medical and agricultural research facilities, government property and breeding facilities and farms, to further their political and social objectives."

In addition to holding hearings, the petition/resolution asks the Judiciary Committee to direct the Department of Justice and other relevant federal agencies to "constitute a national task force to jointly conduct a study and report to the Congress on the extent and effect of domestic and international animal terrorism on enterprises using animals," as well as to direct the General Accounting Office to report to Congress on the "utilization and effectiveness of the current laws as a punishment and a deterrent to those organizations and individuals engaged in unlawful acts, including acts of terrorism against animal enterprises." It further asks the Judiciary Committee to direct the Internal Revenue Service "to vigorously review the tax exempt status of animal rights organizations that advocate, support, fund, or engage in unlawful activities and investigate and take appropriate action to revoke such classification when the facts dictate." The petition also asks the Judiciary Committee to consider increasing the penalties for individuals found guilty of violating the Animal Enterprise Protection Act.

Both individuals and organizations are invited to endorse the NAIA petition. For additional information, visit the NAIA home page at http://www.naiaonline.org/.

USDA Proposal to Regulate Rats, Mice, and Birds Expected

The USDA was expected to publish a notice in late January asking for public comments on whether the agency should regulate rats, mice and birds under the Animal Welfare Act (AWA).

Rats, mice, and birds are not currently covered in the regulations that implement the AWA. When Congress revised the language of the AWA in 1970, it expanded the definition of animal to include "any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, or other such warm-blooded animal, as the Secretary may determine" when used for research, testing, or experimentation. The USDA made an administrative decision to exclude rats, mice, and birds.

Rats and mice are the most commonly used research animals. They are not excluded from the purview of the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals. This policy applies to all vertebrate animals used in research funded by NIH and other PHS agencies. The PHS Policy requires that animal care be provided according to the standards set forth in the *Guide for the Care and Use of Laboratory Animals*. Animal facilities that seek accreditation through the Association for Assessment and Accreditation of Laboratory Animal Care, Int'l. (AAALAC) must also provide care for laboratory rodents that meets the standards of the *Guide*.

Despite the inclusion of rats, mice, and birds under these important parallel sets of standards, animal activists have made much of these species' exclusion from the AWA, which is the primary US law governing the welfare of animals used in research, teaching, and testing. Activists have tried several times in recent years to compel the USDA to extend its enforcement umbrella to rats, mice, and birds.

One reason why USDA has not done so is a shortage of resources. The Animal Plant and Health Inspection Service (APHIS) enforcement budget has been flat for a number of years, and it is estimated that this change would cause a substantial increase in the agency's workload. Researchers have also expressed concerns about the increased regulatory burden AWA recordkeeping and reporting requirements for these species would impose.

The APS will study the details of the *Federal Register* notice when it is published and will formulate a Society response. For additional information about the proposal and how to provide comments as an individual researcher, please contact Public Affairs Officer Alice Ra'anan at araanan@aps.faseb.org.

NIGMS Report Tracks MSTP Graduates' Success

A recent report from the National Institute of General Medical Sciences (NIGMS) assessed the success of the institute's Medical Scientist Training Program (MSTP) graduates in establishing research careers and the types of careers and research activities of MSTP graduates compared to graduates of other combined-degree or PhD programs.

The data were drawn from existing NIH databases, as well as from curricula vitae provided by graduates of MSTP programs and members of several comparison groups.

When compared to other MD-PhD recipients and MSTP trainees who did not complete the PhD, MSTP graduates:

are more likely than most other groups to have received postdoctoral research training support and more likely to have performed both research and clinical postdoctoral training;

are more likely than most other groups to hold academic appointments;

are more likely than other groups to have received research support (from any source);

are more likely to apply for NIH research grants, and, when they do so;

are more likely to be successful—three-fourths of MSTP graduates who applied were successful in obtaining NIH support; and have more total publications and more publications during the most recent 3-year period for which data are available.

MSTP graduates are also more likely than PhD graduates to hold academic appointments and to have received research support from any source. On many other measures, MSTP graduates do not differ from other NIH-supported trainees who graduate from traditional PhD programs. However, the latter is a select group of graduates who themselves have been shown to be more successful than PhD recipients who have not received NIH research training support.

The MSTP program was designed to train investigators who could better bridge the gap between basic science and clinical research by providing both graduate training in the biomedical sciences and clinical training offered through medical schools. What began in 1964 with three programs has now grown to 32 MSTP programs. Since the inception of the MSTP, several assessments documenting the success of the programs have been conducted, but none included graduates of all the funded MSTP programs, and no recent study has provided data on the career outcomes of comparison groups. 💠

G. Edgar Folk, Jr., Senior Physiologist Awards

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, in the amount of \$500, 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 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." \clubsuit

The Online Medical Spellchecker

Medical students and authors still learning their way around the terminology now have a great resource!

Unlike ordinary spellcheck programs, the Online Medical Spellchecker isn't stumped by words like "pancreaticoduodenectomy."

Try it out at http://www.spellex.com/speller.htm/

Questions People Ask About Animals in Research



With Answers from The American Physiological Society

Why do scientists use animals in research?

Do animals have rights?

Do scientists care about the animals' comfort?

Are there alternatives to the use of animals?

How are research animals protected?

Where do scientists get their animals?

ORDER FORM

SHIPPING INFORMATION	PRICING INFORMATION
Name:	TEACHERS/GENERAL PUBLIC Quantity Price includes s&h (book rate)
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Card #:	BROCHURE ON WEB
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Mail or Fax to: The American Physiological Society, Public Affairs Office, 9650 Rockville Pike, Bethesda, MD 20814-3991. FAX: 301-571-8305. For information: 301-530-7105.

Sections Special Functions

Cardiovascular

Section Program Committee Friday, April 16, 12:00 NOON Convention Center, Cornerstone Lounge

Steering Committee Tuesday, April 20, 7:30 AM Grand Hyatt, Wilson Room

Cell and Molecular Physiology

Section Program Committee Friday, April 16, 1:00 PM Convention Center, Room 7

Steering Committee Sunday, April 18, 12:00 NOON Grand Hyatt, Potomac Board Room

Business Meeting Tuesday, April 20, 4:00 PM Grand Hyatt, Franklin Square

Dinner Tuesday, April 20, 6:30 PM Tony Cheng Seafood Restaurant

Central Nervous System

Section Program Committee Friday, April 16, 1:30 PM Convention Center, Cornerstone Lounge

Steering Committee Tuesday, April 20, 7:30 AM Grand Hyatt, Suite 2

Reception Monday, April 19, 6:30 PM Grand Hyatt, Farragut Square

Comparative Physiology

Steering Committee Monday, April 19, 12:00 NOON Grand Hyatt, Wilson Room

Business Meeting, Social, Scholander Awards Monday, April 19, 5:30 PM Convention Center, Room 13

Endocrinology and Metabolism

Steering Committee Sunday, April 18, 12:00 NOON Grand Hyatt, Bulfinch Room

Reception Monday, April 19, 6:30 PM Grand Hyatt, Franklin Square

Environmental and Exercise Physiology

Section Program Committee Friday, April 16, 2:30 PM Grand Hyatt, Suite 2

Steering Committee Saturday, April 17, 6:45 AM Grand Hyatt, Roosevelt Room

Commemorative Service for Ethan R. Nadel Monday, April 19, 6:30 PM Grand Hyatt, Independence B/C

Business Meeting Tuesday, April 20, 4:30 PM Grand Hyatt, Constitution A

Dinner Tuesday, April 20, 7:30 PM Chinatown Gardens Restaurant

Epithelial Transport Group

Steering Committee Meeting Tuesday, April 20, 12:00 NOON Grand Hyatt, Potomac Board Room

Gastrointestinal

Section Program Committee Friday, April 16, 12:00 NOON Convention Center, Cornerstone Lounge

Steering Committee Monday, April 19, 12:00 NOON Grand Hyatt, Suite 2

Business Meeting/Reception Tuesday, April 20, 6:15 PM Grand Hyatt, Independence H/I

History of Physiology Group

Lecture and Luncheon Sunday, April 18, 12:15 PM Chinatown Gardens Restaurant

Neural Control and Autonomic Regulation

Steering Committee Monday, April 19, 7:30 AM Grand Hyatt, Potomac Board Room

Renal

Section Program Committee Friday, April 16, 12:00 NOON Convention Center, Cornerstone Lounge

Steering Committee Sunday, April 18, 7:30 AM Grand Hyatt, Suite 2 Dinner Tuesday, April 20, 6:45 PM Old Ebbitt Grill Restaurant

Respiration

Steering Committee Monday, April 19, 7:30 AM Grand Hyatt, Cabin John Room

Section Program Committee Monday, April 19, 12:00 NOON Grand Hyatt, Cabin John Room

Business Meeting Monday, April 19, 1:00 PM Grand Hyatt, McPherson Square

Dinner Tuesday, April 20, 6:30 pm Mayflower Hotel, Chinese Room

Teaching of Physiology

Steering Committee Friday, April 16, 12:30 PM Grand Hyatt, Cabin John Room

Section Program Committee Friday, April 16, 1:30 PM Grand Hyatt, Cabin John Room

Business Meeting Monday, April 19, 6:00 PM Grand Hyatt, Independence F/G

Arthur C. Guyton Teaching Award Presentation Monday, April 19, 7:00 PM Grand Hyatt, Independence F/G

Dinner Monday, April 19, 8:15 PM John Harvard Brew House Restaurant

Water and Electrolyte Homeostasis

Section Program Committee Friday, April 16, 1:30 PM Grand Hyatt, Suite 1

Steering Committee Tuesday, April 20, 7:00 AM Grand Hyatt, Potomac Board Room

Luncheon and Business Meeting Sunday, April 18, 11:00 AM Caracalla Ristorante



HENRY PICKERING BOWDITCH AWARD LECTURE

Howard J. Jacob Medical College of Wisconsin

End Stage Renal Disease: Of Rat and Man

Monday, April 19, 5:15 pm Grand Hyatt Hotel, Independence A







Distinguished Lectureships

JOSEPH ERLANGER DISTINGUISHED LECTURESHIP OF THE CENTRAL NERVOUS SYSTEM SECTION

William D. Willis, Jr. University of Texas Medical Branch, Galveston

The Role of Signal Transduction Pathways in Central Sensitization of Spinothalamic Tract Neurons

SUNDAY, APRIL 18, 8:30 AM Grand Hyatt Hotel, Constitution A

ROBERT M. BERNE DISTINGUISHED LECTURESHIP OF THE CARDIOVASCULAR SECTION

Brian R. Duling University of Virginia

Cell-Cell Communications in the Vessel Wall: Who's Talking, Who's Listening?

SUNDAY, APRIL 18, 11:15 AM GRAND HYATT HOTEL, INDEPENDENCE A

AUGUST KROGH DISTINGUISHED LECTURESHIP OF THE COMPARATIVE PHYSIOLOGY SECTION

Donald C. Jackson Brown University

Living Without Oxygen: Lessons From the Freshwater Turtle

Monday, April 19, 8:30 am Grand Hyatt Hotel, Constitution B







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

Aubrey E. Taylor

University of South Alabama

Starling's Hypothesis of Transcapillary Fluid Exchange: Then, Now, and the Future

Saturday, April 17, 5:15 pm Grand Hyatt Hotel, Independence A

HORACE W. DAVENPORT DISTINGUISHED LECTURESHIP OF THE GASTROINTESTINAL SECTION

Irwin Arias

Tufts University

The Bile Canaliculus: Biology and Pathobiology

SUNDAY, APRIL 18, 8:30 AM WASHINGTON CONVENTION CENTER, ROOM 20/21/22

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

Robert D. Foreman

University of Oklahoma Health Science Center

Central and Autonomic Neural Mechanisms of Angina Pectoris

SUNDAY, APRIL 18, 2:30 PM Grand Hyatt Hotel, Constitution A

HUGH DAVSON DISTINGUISHED LECTURESHIP OF THE CELL AND MOLECULAR PHYSIOLOGY SECTION

Jens Christian Skou University of Aarhus, Denmark

The Identification of the Sodium-Potassium Pump

Monday, April 19, 11:15 am Grand Hyatt Hotel, Independence A

The Physiologist





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

Leonard S. Jefferson Hershey Medical Center, Pennsylvania State University

Protein Metabolism and its Regulation by Hormones and Nutrients

Monday, April 19, 2:30 pm Grand Hyatt Hotel, Constitution A

Edward F. Adolph Distinguished Lectureship of the Environmental and Exercise Physiology Section

John O. Holloszy Washington University

Regulation of Carbohydrate Metabolism in Muscle During and After Exercise

TUESDAY, APRIL 20, 11:15 AM WASHINGTON CONVENTION CENTER, ROOM 20/21/22

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

Richard C. Boucher University of North Carolina at Chapel Hill

Mysteries of Thin Film: Airway Surface Liquid

TUESDAY, APRIL 20, 2:30 PM Grand Hyatt Hotel, Constitution A

Walter C. Randall Lecture in Biomedical Ethics (sponsored by Taylor University)

Frank E. Young Former Commissioner of FDA; Assistant Surgeon General

Biomedical Ethics in the 21st Century: Human Cloning and Embryo Manipulation

Monday, April 19, 12:45 pm Washington Convention Center, Room 20/21/22







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

Alan Kim Johnson University of Iowa

Parallel and Complementary Neural Mechanisms in the Maintenance of Body Fluid and Cardiovascular Homeostasis

TUESDAY, APRIL 20, 8:30 AM GRAND HYATT HOTEL, CONSTITUTION A

CARL W. GOTTSCHALK DISTINGUISHED LECTURESHIP OF THE RENAL SECTION

Dennis Brown

Massachusetts General Hospital

Modulation of Membrane Structure and Function in Transporting Epithelia: When Cell Biology Meets Physiology

TUESDAY, APRIL 20, 11:15 AM Grand Hyatt Hotel, Independence A

Dorothy Dillon Eweson Lecture Series on the Advances in Aging Research

(SPONSORED BY THE AMERICAN FEDERATION FOR AGING RESEARCH)

Edward J. Masoro University of Texas Health Science Center, San Antonio

Dietary Restriction in the Rodent Model: Insights on the Biology of Aging

SUNDAY, APRIL 18, 12:45 PM WASHINGTON CONVENTION CENTER, ROOM 20/21/22



Animal Care and Experimentation Sunday, April 18, 7:30 AM Grand Hyatt, Bulfinch Room

Awards Sunday, April 18, 7:30 AM Grand Hyatt, Roosevelt Room

Career Opportunities in Physiology Monday, April 19, 7:30 AM Grand Hyatt, Bulfinch Room

Committee on Committees Saturday, April 17, 8:00 AM Grand Hyatt, Cabin John Room

Education Sunday, April 18, 7:30 AM

Grand Hyatt, Cabin John Room

Committee Meetings

International Physiology Sunday, April 18, 12:30 PM Grand Hyatt, Roosevelt Room

Joint Program Saturday, April 17, 8:00 AM Grand Hyatt, Farragut Square

Liaison With Industry Tuesday, April 20, 7:30 AM Grand Hyatt, Cabin John Room

Long-Range Planning Monday, April 19, 7:30 AM Grand Hyatt, Wilson Room

Membership Sunday, April 18, 7:30 AM Grand Hyatt, Suite 1 **Porter Physiology Development** Tuesday, April 20, 7:30 AM Grand Hyatt, Roosevelt Room

Public Affairs Monday, April 19, 7:00 AM Grand Hyatt, Roosevelt Room

Section Advisory Friday, April 16, 3:00 PM Grand Hyatt, Cabin John Room

Joint With Council Friday, April 16, 7:00 PM Grand Hyatt, Farragut Square

Women in Physiology Wednesday, April 21, 7:30 AM Grand Hyatt, Roosevelt Room

Publications Special Functions

Journal Editorial Boards Group Meeting Saturday, April 17, 3:00 PM Convention Center, Room 25/26

AJP: Advances in Physiology Education Editor and Associate Editors

Monday, April 19, 7:30 AM Grand Hyatt, Suite 1

AJP: Cell Physiology Editor and Associate Editors Monday, April 19, 12:00 NOON Grand Hyatt, Roosevelt Room

AJP: Endocrinology and Metabolism Editor and Associate Editors Tuesday, April 20, 12:00 NOON Grand Hyatt, Cabin John Room

AJP: Heart and Circulatory Physiology Editor and Associate Editors Sunday, April 18, 7:30 AM Grand Hyatt, Wilson Room AJP: Lung Cellular and Molecular Physiology Editor and Associate Editors Tuesday, April 20, 12:00 NOON Grand Hyatt, Wilson Room

AJP: Renal Physiology Editor and Associate Editors Tuesday, April 20, 7:30 AM Grand Hyatt, Bulfinch Room

AJP: Regulatory, Integrative and Comparative Physiology Editor and Associate Editors Sunday, April 18, 7:30 AM Grand Hyatt, Potomac Board Room

Journal of Applied Physiology Editor and Associate Editors Sunday, April 18, 12:00 NOON Grand Hyatt, Cabin John Room *News in Physiological Sciences* Editor and Associate Editors Tuesday, April 20, 12:00 NOON Grand Hyatt, Roosevelt Room

Handbook Committee Tuesday, April 20, 7:30 AM Grand Hyatt, Suite 1

History of Physiology Book Committee Monday, April 19, 12:00 NOON Grand Hyatt, Potomac Board Room

Technical Series Book Committee Monday, April 19, 7:30 AM Grand Hyatt, Suite 2

APS Annual Business Meeting and Award Presentations

Tuesday, April 20, 5:15 PM Grand Hyatt, Independence A



American Physiological Society

> EB '99 Program

April 17-21, 1999 Washington, DC

Saturday, April 17—Morning

Cardiovascular Biology Theme Refresher Course for Teaching Cardiovascular Physiology F.L. Belloni 8:30 AM—Grand Hyatt, Constitution B

Journal of Physiology Secretion: Mechanisms and Regulation of Exocytosis B.H. Hirst & D.A. Eisner 9:00 AM—Washington Convention Center, Room 31

Saturday, April 17—Afternoon

"A Call to Activism" Congressional Advocacy Workshop S.L. Ruhe 1:00 PM—Grand Hyatt, Independence D/E

Journal of Physiology Secretion: Mechanisms and Regulation of Exocytosis B.H. Hirst & D.A. Eisner 2:00 PM—Washington Convention Center, Room 31

Neurobiology Theme Synaptic Mechanisms in the Nucleus of the Solitary Tract M. Andresen & P. Mueller 2:30 PM—Grand Hyatt, Independence H/I

Epithelial Cell Biology Theme **Regulation of the Epithelial Na Channel** M.S. Awayda 2:30 PM—Grand Hyatt, Constitution C

Experimental Physiology in the Polar Regions: The Historical Development G.E. Folk, Jr. & R. Elsner 2:30 PM—Washington Convention Center, Room 23/24

Cardiovascular Biology, Respiratory Biology, Signal Transduction and Gene Regulation Theme Alterations in Redox State and Cell Signaling D.G. Harrison 2:30 PM—Grand Hyatt, Constitution A

Neurobiology, Respiratory Biology Theme **The Medullary Raphe: Such an Obvious Role in Respiratory Control, But What Exactly is It?** G. Richerson 2:30 PM—Grand Hyatt, Independence B/C Cell Injury, Inflammation and Repair Theme

A. Clifford Barger Memorial Symposium: Genetic Mechanisms Determining the Role of the Kidney in the Pathogenesis of Hypertension (sponsored by William Townsend Porter Foundation)
R.J. Roman & J. P. Granger
2:30 PM—Washington Convention Center, Room 20/21/22

Physiologists and Outreach Activities Directed to Lower Primary Grades
J. Schadt & B.E. Goodman
1:00 PM—Grand Hyatt, Constitution B

Cardiovascular Biology Theme Acute (Nongenomic) Effects of the Gonadal Steroids on Vascular Function J.N. Stallone and R.E. White 2:30 PM—Grand Hyatt, Independence F/G

Microcirculatory Society Cardiovascular Biology, Cell Injury, Inflammation and Repair Theme

President-Elect's Symposium: Microcirculatory Studies of Inflammation and Immune Function (An Example of Microcirculation Research Bridging Molecular Biology, Physiology and Clinical Medicine)
R.F. Tuma
3:00-5:00 PM—Washington Convention Center, Room 38

Physiology in Perspective—The Walter B. Cannon Memorial Award Lecture (sponsored by the Grass Foundation)
"Starling's Hypothesis of Transcapillary Fluid Exchange: Then, Now, and the Future"
A.E. Taylor
5:15 PM—Washington Convention Center, Room 38

Annual APS MIXER Saturday, April 17, 9:00 PM-12:00 Midnight

Grand Hyatt, Constitution B/C

Enjoy sumptuous desserts, meet with your colleagues, and dance to the music of "Invitation."

Sunday, April 18—Morning

Epithelial Cell Biology, Signal Transduction and Gene Regulation Theme
Asymmetry of Receptor Signaling in Epithelial Cells
K. Amsler & P. Wilson
8:30 AM—Grand Hyatt, Independence F/G

Horace Davenport Distinguished Lectureship of the APS Gastrointestinal Section

"The Bile Canaliculus: Biology and Pathobiology" I. Arias

8:30 AM—Washington Convention Center, Room 20/21/22

The Bile Canaliculus

I. Arias 8:30 AM—Washington Convention Center, Room 20/21/22

Neurobiology Theme Endothelin and the Central and Peripheral Nervous System D.H. Damon and C. Hinojosa-Laborde

8:30 AM—Grand Hyatt, Independence D/E

Neurobiology, Respiratory Biology Theme

Time Domains of Hypoxic Ventilatory Response: Adaptive Mechanisms in Short- and Long-Term Responses T.E. Dick & G.S. Mitchell 8:30 AM—Grand Hyatt, Constitution B

Cardiovascular Biology, Respiratory Biology Theme Gene Transfer to Blood Vessels D.D. Heistad

8:30 AM—Grand Hyatt, Independence A

Society for Experimental Biology and Medicine Antioxidants and Oxidative Stress in Health and Disease R. Knopp & T.M. Bray 8:30 AM—Grand Hyatt, Constitution C

Cardiovascular Biology Theme The Gravity of Circulation H.B. Lillywhite and A.R. Hargens 8:30 AM—Grand Hyatt, Independence H/I

Teaching Critical Thinking Skills in Physiology: An Interactive Workshop S. Mierson & A.P. McNeal

8:30 AM—Washington Convention Center, Room 25/26

Control of Renal Function by Cytochrome P450 Eicosanoids R.J. Roman & J. Imig

8:30 AM—Grand Hyatt, Independence B/C

Neurobiology, Theme: Signal Transduction and Gene Regulation Theme

Joseph Erlanger Distinguished Lectureship of the APS Central Nervous System Section

"The Role of Signal Transduction Pathways in Central Sensitization of Spinothalamic Tract Neurons"
W.D. Willis, Jr.
8:30 AM—Washington Convention Center, Room 23/24

Cytokines, Nutrients, and Energy Balance D.A. York 8:30 AM—Grand Hyatt, Constitution A

Cardiovascular Biology Theme

Robert M. Berne Distinguished Lectureship of the APS Cardiovascular Section "Cell-Cell Communications in the Vessel Wall: Who's Talking, Who's Listening?" B.R. Duling 11:15 AM—Grand Hyatt, Independence A

Sunday, April 18—Afternoon

Women in Physiology Mentoring Program Luncheon 12:00 NOON—Washington Convention Center, Lafayette/Farragut Squares

The American Federation for Aging Research **Dorothy Dillon Eweson Lecture Series on the Advances in Aging Research "Dietary Restriction in the Rodent Model: Insights on the Biology of Aging"** E.S. Masoro 12:45 PM—Washington Convention Center, Room 20/21/22

Microcirculatory Society Cardiovascular Biology Theme Microcirculatory Society Landis Award Lecture 1:30 PM—Grand Hyatt, Independence A

Epithelial Cell Biology Theme

Advances in the Characterization of Na⁺/H⁺ Exchanger (NHE) Isoforms P. Aronson & M. Donowitz 2:30 PM—Grand Hyatt, Independence F/G

Cardiovascular Biology, Neurobiology Theme

Genetic Models and Novel Tools: Application of Physiological Genomics to the Study of Neural Control of Cardiovascular Function R. Davisson 2:30 PM—Washington Convention Center, Room 25/26

Epithelial Cell Biology Theme Chloride Channels: Mechanisms and Physiological

Functions D. Dawson 2:30 PM—Washington Convention Center, Room 23/24

Neurobiology Theme

Peripheral and Central Mechanisms of Visceral and Somatic Pain R.D. Foreman 2:30 PM—Grand Hyatt, Constitution A

Neurobiology Theme

Carl Ludwig Distinguished Lectureship of the APS Neural Control and Autonomic Regulation Section "Central and Autonomic Neural Mechanisms of Angina Pectoris" R.D. Foreman 2:30 PM—Grand Hyatt, Constitution A

Teaching and Educational Innovation J. Griswold 2:30 PM—Grand Hyatt, Constitution B

American Federation for Medical Research **Translational Research in Psychiatry: From Molecular Medicine to Clinical Practice** J. Licinio 2:30 PM—Grand Hyatt, Independence D/E

Cardiovascular Biology, Neurobiology Theme Neurohumoral Mechanisms in the Regulation of Blood Volume and Arterial Pressure T. Lohmeier & J.T. Cunningham 2:30 PM—Grand Hyatt, Independence H/I

Cell Injury, Inflammation and Repair, Neurobiology, Respiratory Biology Theme

Comparative Mechanisms to Survive Brain Anoxia: Mitochondria to Organism P. Lutz 2:30 PM—Grand Hyatt, Constitution C

Signal Transduction and Gene Regulation Theme Role of Plasmalemmal Caveolae in Signal Transduction P.W. Shaul 2:30 PM—Washington Convention Center, Room 20/21/22

Monday, April 19—Morning

Cardiovascular Biology, Respiratory Biology Theme Controversies in Cardiovascular Physiology: What are the Primary Local Determinants of Vascular Tone? W. Chilian 8:30 AM—Grand Hyatt, Constitution C

Metabolic and Disease Processes Theme Glucose Uptake by Contracting Muscle G.L. Dohm 8:30 AM—Washington Convention Center, Room 25/26 Physiology InFocus: Genomics and Molecular Medicine *Physiological Genomics*: Launching a New Journal
V. Dzau
8:30 AM—Grand Hyatt, Independence A

Epithelial Cell Biology Theme **Molecular Physiology of Urea Transporters** R. Gunn & J. Sands 8:30 AM—Washington Convention Center, Room 20/21/22

American Federation for Medical Research Cell Injury, Inflammation and Repair Theme **The Road to Apoptosis: Indictment, Judgement, Execution, and Reprieve** S. Gupta & V. Dixit 8:30 AM—Grand Hyatt, Independence B/C

Biomedical Engineering Society Biomaterial Design D.A. Hammer 8:30 AM—Grand Hyatt, Independence D/E

August Krogh Distinguished Lectureship of the APS Comparative Physiology Section "Living Without Oxygen: Lessons From the Freshwater Turtle" D.C. Jackson 8:30 AM—Grand Hyatt, Constitution B

Scholander Award Competition and August Krogh Distinguished Lectureship D.C. Jackson 8:30 AM—Grand Hyatt, Constitution B

Neurobiology Theme Pain and Autonomic Integration P. Mason 8:30 AM—Grand Hyatt, Independence H/I

Cell Injury, Inflammation and Repair, Respiratory Biology Theme

Mechanisms of Lung Alveolar Epithelial Injury S. Matalon & M.A. Matthay 8:30 AM—Washington Convention Center, Room 23/24

Metabolic and Disease Processes Theme Hormonal Control of Protein Metabolism in Muscle R.R. Wolfe 8:30 AM—Grand Hyatt, Independence F/G

Hugh Davson Distinguished Lectureship of the APS Cell & Molecular Physiology Section "The Identification of the Sodium-Potassium Pump" J.C. Skou 11:15 AM—Grand Hyatt, Independence A

APS Careers in Physiology: Broadening Your Horizons— Expanding Opportunities E.J. Zambraski 11:30 AM—Grand Hyatt, Independence D/E

Monday, April 19—Afternoon

Walter C. Randall Lecture in Biomedical Ethics (spon sored by Taylor University)
"Biomedical Ethics in the 21st Century: Human Cloning and Embryo Manipulation"
F.E. Young
12:45 PM—Washington Convention Center, Room 20/21/22

Metabolic and Disease Processes Theme Insulin and Growth Factor Receptor Signaling J. Avruch 2:30 PM—Grand Hyatt, Constitution A

Cell Injury, Inflammation and Repair, Metabolic and Disease Processes Theme Cytokines and Body Temperature in Health and Disease C. Blatteis

2:30 PM—Washington Convention Center, Room 25/26

Metabolic and Disease Processes Theme

Solomon A. Berson Distinguished Lectureship of the APS Endocrinology & Metabolism Section "Protein Metabolism and its Regulation by Hormones and Nutrients" L.S. Jefferson 2:30 PM—Grand Hyatt, Constitution A

American Federation for Medical Research *Cell Injury, Inflammation and Repair Theme* **Regulation of Cellular Processes by Infectious Microbes** C.E. McCall 2:30 PM—Grand Hyatt, Independence B/C

Physiology InFocus: Genomics and Molecular Medicine *Cellular Growth and Development Theme* **Tissue Specific Gene Targeting as a Window Into**

Physiological Function L.G. Navar & C.D. Sigmund 2:30 PM—Grand Hyatt, Independence A Muscle Fatigue T.M. Nosek 2:30 PM—Grand Hyatt, Constitution B

Angiotensin Receptors and Signaling: Evolution and Perspectives H. Nishimura 2:30 PM—Grand Hyatt, Independence D/E

Epithelial Cell Biology Theme **Families of Sodium-Coupled Transporters** A. Pajor 2:30 PM—Washington Convention Center, Room 20/21/22

Cellular Growth and Development, Respiratory Biology Theme Mechanisms of Lung Vascular Development

J.M. Shannon and Sarah Gebb 2:30 PM—Washington Convention Center, Room 23/24

Biomedical Engineering Society Mechanotransduction G.A. Truskey 2:30 PM—Grand Hyatt, Constitution C

Respiratory Biology Theme **Highlights—Graduate Student Posters in Respiration Physiology** I.F. McMurtry & G.S. Mitchell 6:00 PM—Grand Hyatt, Constitution B

Henry Pickering Bowditch Award Lecture "End Stage Renal Disease: Of Rat and Man" H.J. Jacob

5:15 PM—Grand Hyatt, Independence A

Tuesday, April 20—Morning

Cardiovascular Biology, Cell Injury, Inflammation and Repair, Cellular Growth and Development, Respiratory Biology Theme Angiotensin in Normal and Abnormal Growth of Cardiovascular Tissue K. Berecek and R. Levi 8:30 AM—Washington Convention Center, Room 31

Metabolic and Disease Processes, Neurobiology Theme Neuroendocrine Determinants of Obesity and Satiety J.F. Caro 8:30 AM—Grand Hyatt, Constitution B

Epithelial Cell Biology Theme

Regulatory Peptides, Guanylin, Uroguanylin and Lymphoguanylin and their Cognate Receptors L.R. Forte 8:30 AM—Grand Hyatt, Independence H/I

Epithelial Cell Biology Theme

Mechanisms and Regulation of Epithelial Calcium Transport: Genetics Illuminating Physiology P. Friedman 8:30 AM—Washington Convention Center, Room 25/26

Cardiovascular Biology, Respiratory Biology Theme Redox Regulation of Gene Expression in Hypoxia M.N. Gillespie & B.A. Freeman 8:30 AM—Grand Hyatt, Independence F/G

Cardiovascular Biology, Cell Injury,

Inflammation and Repair, Respiratory BiologyTheme Mechanisms of Ischemia Reperfusion: Application of Gene-Targeted Animal Models D.N. Granger and D.J. Lefer 8:30 AM—Grand Hyatt, Constitution C

Physiology InFocus: Genomics and Molecular Medicine Theme: Cellular Growth and Development
From Genome to Function
S. Gullans
8:30 AM—Grand Hyatt, Independence A

Cardiovascular Biology, Neurobiology Theme Neural Circuitry of Body Fluid and Cardiovascular Homeostasis J.R. Haywood 8:30 AM—Grand Hyatt, Constitution A

Neurobiology Theme

Ernest H. Starling Distinguished Lectureship of the APS Water and Electrolyte Homeostasis Section "Parallel and Complementary Neural Mechanisms in the Maintenance of Body Fluid and Cardiovascular Homeostasis" A.K. Johnson 8:30 AM—Grand Hyatt, Constitution A

Neurobiology Theme Vagal Mechanisms in Neural Control D. Mendelowitz and A. Travagli 8:30 AM—Washington Convention Center, Room 23/24

Epithelial Cell Biology Theme

Understanding How Cells Sense Volume: New Sites and Insights K. Strange 8:30 AM—Grand Hyatt, Independence D/E

Cardiovascular Biology, Neurobiology Theme Is Active Muscle Mass an Important Target for Vasoconstriction During Exercise? C.M. Tipton 8:30 AM—Washington Convention Center, Room 20/21/22

American Federation for Medical Research Beyond Chemotherapy: The Scientific Bases for New Cancer Treatments P.H. Wiernik 8:30 AM—Grand Hyatt, Independence B/C

Carl W. Gottschalk Distinguished Lectureship of the APS Renal Section

"Modulation of Membrane Structure and Function in Transporting Epithelia: When Cell Biology Meets Physiology"
D. Brown

11:15 AM-Grand Hyatt, Independence A

Edward F. Adolph Distinguished Lectureship of the APS Environmental & Exercise Physiology Section "Regulation of Carbohydrate Metabolism in Muscle During and After Exercise" J. Holloszy 11:15 AM—Washington Convention Center, Room 20/21/22

Tuesday, April 20—Afternoon

American Federation for Medical Research **Public Policy Session: Meeting the Special Needs of the Physician Scientist: Role of the Federal Government** 1:00 PM—Grand Hyatt, Independence D/E

Respiratory Biology Theme

Julius H. Comroe Distinguished Lectureship of the APS Respiration Section "Mysteries of Thin Film: Airway Surface Liquid" R.C. Boucher 2:30 PM—Grand Hyatt, Constitution A

Respiratory Biology Theme Julius H. Comroe Lectureship Featured Topic R.C. Boucher 2:30 PM—Grand Hyatt, Constitution A

Membrane Trafficking and the Regulation of Ion Transport Proteins

M. Caplan & J. Lippincott-Schwartz 2:30 PM—Grand Hyatt, Independence H/I

Cardiovascular Biology, Cell Injury, Inflammation and Repair Theme

Effect of Cardiovascular Disease on the Structure and Function of Skeletal Muscle R.C. Carlsen and S.D. Gray 2:30 PM—Washington Convention Center, Room 20/21/22

Mucosal Function, Adaptation and Growth C. Cheeseman 2:30 PM—Grand Hyatt, Constitution B

Cardiovascular Biology Theme Endothelial Factors in Cardiorenal Regulation J.P. Granger & C. Wilcox 2:30 PM—Grand Hyatt, Independence F/G

Cell Injury, Inflammation and Repair Theme **Phosphodiesterases in Renal Physiology and Pathophysiology** M. Humphreys & T. Dousa 2:30 PM—Grand Hyatt, Independence B/C

Remote Monitoring of Physiological Functions D. Jones and P. Butler 2:30 PM—Washington Convention Center, Room 23/24

Physiology InFocus: Genomics and Molecular Medicine Secrets of the Sarcomere Revealed by Transgenesis and Gene Transfer J.M. Metzger & R.J. Solaro

2:30 PM—Grand Hyatt, Independence A

Cardiovascular Biology, Cell Injury, Inflammation and Repair, Respiratory Biology Theme **Transplantation Into the Next Century: Genetic Engineering and Xenotransplantation** V. Miller and S. Saadi 2:30 PM—Grand Hyatt, Constitution C

Physiology InFocus: Genomics and Molecular MedicineGenetic Mapping and Genetic ModelsC.D. Sigmund2:30 PM—Washington Convention Center, Room 25/26

Neurobiology Theme Regulation of Sympathetic Function by Nitric Oxide J. Zanzinger and I.H. Zucker 2:30 PM—Grand Hyatt, Independence D/E

APS Business Meeting

5:15 PM—Grand Hyatt, Independence A

American Federation for Medical Research VA Career Development Poster Discussion 6:00 PM—Grand Hyatt, Constitution B

Wednesday, April 21—Morning

Cardiovascular Biology Theme Sex Hormones and Pregnancy in Cardiovascular Control V.L. Brooks & D. Ely 8:30 AM—Washington Convention Center, Room 23/24

Cellular Growth and Development Theme Postmenopausal Physiology J. Cannon 8:30 AM—Washington Convention Center, Room 20/21/22

Glucagon-Like Peptide (GLP) 2: Intestinal Growth Factor and Regulatory Peptide C. Cheeseman 8:30 AM—Grand Hyatt, Independence D/E

Cardiovascular Biology, Neurobiology Theme Molecular Approaches to Study Cerebral Circulation: New Insight into Physiology and Pathophysiology F. Faraci and D.W. Busija 8:30 AM—Grand Hyatt, Constitution A

American Federation for Medical Research HIV Vaccine Development: Opportunities and Challenges M.B. Feinberg 8:30 AM—Grand Hyatt, Independence B/C

Epithelial Cell Biology Theme **Role of Membrane Traffic in Epithelial Transport Regulation** R. Frizzell 8:30 AM—Washington Convention Center, Room 14/15

Cardiovascular Biology, Cell Injury, Inflammation and Repair Theme Physiological Basis of Congestive Heart Failure S.R. Houser

8:30 AM—Grand Hyatt, Constitution B

Respiratory Biology Theme Second Messengers in Hypoxia N.R. Prabhakar 8:30 AM—Grand Hyatt, Independence F/G

Cardiovascular Biology, Respiratory Biology Theme Mechanisms Involved in Hypoxic Pulmonary

Vasoconstriction: Can Everyone be Right?

E.K. Weir & K.K. Griendling 8:30 AM—Grand Hyatt, Constitution C

Wednesday, April 21—Afternoon

Neurobiology, Respiratory Biology Theme Physiological and Molecular Responses of Peripheral Chemoreceptors to Chronic Stimuli

G.E. Bisgard 2:30 PM—Washington Convention Center, Room 13

Cardiovascular Biology, Cell Injury, Inflammation and Repair Theme

Cardiovascular Adaptations and Responses to Ischemia J. Canty 2:30 PM—Washington Convention Center, Room 14/15

Cardiovascular Biology Theme

Cardiac Electromechanics: The Development and Validation of Whole Heart Models P. Hunter 2:30 PM—Washington Convention Center, Room 27

Mitochondrial Maturation and Biogenesis in Striated Muscle M.A. Portman 2:30 PM—Washington Convention Center, Room 31

Cardiovascular Biology, Cell Injury, Inflammation and Repair, Respiratory Biology Vascular Actions of Nitric Oxide P. Vanhoutte 2:30 PM—Washington Convention Center, Room 30

Cell Injury, Inflammation and Repair Theme **The Neuroimmune Axis in Gut Inflammation: Clues to Therapy** J. Wallace 2:30 PM—Washington Convention Center, Room 23/24

Physiology InFocus

Genomics and Molecular Medicine

Organizers: L. Gabriel Navar, Tulane University, and Victor Dzau, Brigham and Women's Hospital and Harvard Medical School Supported by an Educational Grant from Burroughs Wellcome Fund and Merck Genome Research Institute

Sessions:

17-2<u>1, 1999</u>

- Physiological Genomics: Launching a New Journal
- Tissue-Specific Gene Targeting as a Window into Physiological Function
- From Genome to Function
- Secrets of the Sarcomere Revealed by Transgenesis and Gene Transfer



For More Information Contact:

Experimental Biology '99 9650 Rockville Pike Bethesda, MD 20814-3998 Tel: 301-530-7010 Fax: 301-530-7014 Email: eb@faseb.org

Website: http://www.faseb.org/meetings/eb99/index.htm

Public Affairs Sessions Planned for EB '99

Have you ever wished that your Congressman or Senator was better informed about science issues? Have you ever been in Washington for a conference and wanted to meet with your member of Congress, but not known how to set up an appointment or what to say when you got there?

Worry and wonder no more! While you're in DC for Experimental Biology '99 (April 17-21), you can learn how to become an effective advocate for medical research.

As you know, Congress provided NIH with an unprecedented 15% budget increase for FY1999. The word around town is that it's likely to be much tougher to replicate this increase for FY2000 and keep NIH on the path to a five-year doubling of its budget. Other federal agencies that fund medical research face equally difficult challenges. This is *not* a good time to rest on our laurels!

Make plans today to attend EB '99 and join us for these important events:

A Call to Activism

Saturday, April 17, 1:00-3:00 PM Grand Hyatt Hotel, Independence D/E

In this fun and informative workshop, you'll learn the "do's" and "don't's" of meeting with members of Congress. Former Congressman Butler Derrick (D-SC), along with several of your colleagues, will put on a series of skits illustrating what makes for a good Congressional visit. FASEB legislative consultants Shirley Ruhe and Michael Stephens, both veteran Congressional staffers, will focus on the best way to get your message across, including how to respond to tough questions on controversial topics. Refreshments provided.

Biomedical Graduate and Postdoctoral Training Programs in the Twenty-First Century: The Postdoctoral Experience

Sunday, April 18, 1:00-4:30 PM

Washington Convention Center, Rooms 4/5

Panelists from government, academia, and professional societies look at employment trends and training issues in the biomedical arena, a topic much debated in light of several recent studies. Co-sponsored by the American Association of Anatomists (AAA) and Proctor & Gamble Pharmaceuticals; co-chaired by Robert R. Cardell, PhD and Richard L. Drake, PhD.

Patent Law & Biological Materials - Unexpected

Consequences of Exclusive Licensing

Monday, April 19, 11:30 AM-1:00 PM Washington Convention Center, Room 10/11/12

Panelists from academia, industry, and regulatory agencies will consider the impact that patenting biological materials may have on research and clinical diagnosis. Sponsored by the American Society for Investigative Pathology (ASIP); cochaired by Mark E. Sobel and Sandra R. Wolman.

Walter C. Randall Lecture in Biomedical Ethics (sponsored by Taylor University)

Biomedical Ethics in the 21st Century: Human Cloning and Embryo Manipulation

Monday, April 19, 12:45-1:45 PM

Washington Convention Center, Rooms 20-22

Former FDA Commissioner and Assistant Surgeon General Frank E. Young will give the Walter C. Randall Lecture in Biomedical Ethics. Exciting research is taking place in human cloning and embryo manipulation, but the ethical questions raised by this research promises to remain a source of controversy as we move into the 21st century.

IACUC Issues: Panel and Audience Participation

Monday, April 19, 1:30-3:30 PM

Washington Convention Center, Room 28

Panelists from academia and NIH's Office of Protection from Research Risks will give short presentations on selected issues of importance to IACUCs, followed by audience discussion. Co-sponsored by the American Society for Pharmacology and Experimental Therapeutics' (ASPET) Committee on the Care and Use of Research Animals and the American Physiological Society's (APS) Animal Care and Experimentation Committee; co-chaired by Donald O. Allen, PhD (ASPET) and C. Terrance Hawk, PhD, DVM (APS).

Science Funding: Congressional Overview

Tuesday, April 20, 12:00-1:00 РМ

US Capitol Building (To be announced)

Put your new knowledge and skills into practice! Key members of Congress and Congressional staff will make brief presentations and answer your questions. Contact APS Public Affairs Officer Alice Ra'anan (301-530-7105) to reserve your seat. Light lunch will be served.



Congressional Advocacy Workshop At Experimental Biology '99

Saturday, April 17, 1999 1-3 pm Grand Hyatt Hotel Independence Room D/E

Join us for this special session to sharpen your skills as a legislative advocate for biomedical research.

Refreshments will be served.

The Political Game – Winning and Losing

Shirley L. Ruhe, SLR Budget and Legislative Consulting

Shirley L. Ruhe has more than 24 years of experience in Congressional budgeting and the legislative process, most recently serving as Director of Budget Priorities and Economic Policy for the House Budget Committee from 1987-1994. For the past three years, Ms. Ruhe has put this experience to work as head of her own consulting firm, where she now advises organizations such as FASEB how win the battle of the budget. She developed this workshop to train scientists to be effective advocates for biomedical research.

Political Advocacy Made Easy

The Hon. Butler Derrick, Powell, Goldstein, Frazier and Murphy

Michael A. Stephens, Vice President, Van Scoyoc Associates

Butler Derrick (D-SC) represented South Carolina's 3rd Congressional District for 20 years, from 1975 until his retirement in 1995. He now heads the government relations practice for the Washington, DC office of Powell, Goldstein, Frazier & Murphy, LLP. During his Congressional career, Derrick rose to become the Chief Deputy Majority Whip, the fifth-highest ranking House Leadership post. His committee assignments included the Rules committee (where he was Vice Chairman), Budget, Banking, and Government Relations.

Michael A. Stephens was a professional staff member for the House Labor-HHS-Education Appropriations Subcommittee for 20 years, and its Staff Director for 6 years. A recognized authority on the Congressional appropriations process, he is frequently quoted by National Public Radio, Science and The Washington Fax because of his expertise in biomedical research issues and the NIH. Mr. Stephens currently serves as consultant to FASEB on government affairs issues.

Feature presentation: You will also have the opportunity to applaud your colleagues as they demonstrate the right and wrong ways to meet a Member of Congress.

SPONSORS

 ▲American Physiological Society▲
 ▲American Society for Pharmacology and Experimental Therapeutics▲
 ▲American Society for Investigative Pathology▲
 ▲American Society for Nutritional Sciences ▲
 ▲ American Association of Immunologists▲
 ▲American Association of Anatomists▲

How to Answer Tough Questions

J.R. Haywood, University of Texas Health Science Center, San Antonio

This segment will focus on how to get the message across. It will also provide guidance on ways to handle tough questions that might come up when you meet with Members of Congress and their staff.

Special Pre-EB '99 Outreach Workshop for APS Members



My Health, My World Certified Facilitators Training Workshop Friday, April 16, 1999 Washington, DC 8:00 a.m. to 5:00 p.m.

My Health, My World provides multicomponent environmental health sciences curriculum materials and inservice workshops for Grades K-4. Components include: Science adventure story books, Hands-on activity guides for teachers, and Mini-magazines for students. Certified facilitators are authorized to conduct workshops for teachers or students and are provided with:

free printed classroom materials, and

hands-on equipment and supplies.

If you do outreach to elementary schools or classrooms, don't miss this workshop! For more information, see the web pages at http://www.faseb.org/aps/educatn/mhmweb.html

Funding provided by the National Institute of Environmental Health Sciences, APS, and Baylor College of Medicine.

Yes! Sign me up for the FREE My Health My World Outreach Workshop at EB'99
Name
Address
City, State, Zip
Phone Fax
Email
The workshop is free, but registration is limited. To register, complete and fax this form to: Marsha Matyas, APS Education Office, fax (301) 571-8305. PLEASE PRINT CLEARLY!

Announcements

APS Elections! Watch your mailboxes.

The American Physiological Society 1999-2000 election ballot will be arriving shortly.

You will have the opportunity to vote for one of the following candidates for Presidentelect and for two of the following candidates for Councillor, as put forward by the Nominating Committee.

> <u>For President-Elect:</u> Gerald F. DiBona Celia D. Sladek

<u>For Councillor:</u> Hannah V. Carey William W. Chin Steven C. Hebert Joseph H. Szurszewski Jo Rae Wright

The deadline for receipt of the election ballot is on or before March 5, 1999.

Second Federation of European Physiological Societies (FEPS) June 30 -July 4, 1999 Prague, Czech Republic

The Final Announcement and Call for Abstracts has now been printed for the 2nd FEPS Congress.

The scientific program has been finalized and includes 7 plenary lectures, 21 symposia and 3 workshops, along with 7 poster sessions and 7 oral communication sessions. The Congress abstracts will be published in *Physiological Research*, and, in addition, the abstracts will be published in electronic form on the *Physiological Research* website.

Copies of the Final Announcement can be obtained by contacting the Congress Secretariat at:

Second FEPS Congress Secretariat Czech Medical Association J.E. Purkyně Sokolská 31 120 26 Prague 2, Czech Republic TEL: +420 2 297-271 or FAX: +420 2 294 610 Email: SENDEROVA@CLS.CZ

Current information about the Congress, as well as the registration and abstract forms, is also available on the Congress web site: http://uemweb.biomed.cas.cz/FEPS99.htm

Congress Deadlines

Accommodation Reservation Cancellation of Registration April 30, 1999 June 1, 1999

Plenary Lectures

J. Bureš P. Jonas E. Neher E.R. Weibel G.E. Bisgard M.M. Merzenich Y. Touitou

Round Table

Physiome - the Future of Physiology Chair: R.S. Reneman

Conferences

1999 APS Conference Biology of Potassium Channels: From Molecules to Disease September 22-26, 1999 • Snowmass, CO Snowmass Village

ORGANIZERS:

Steve Hebert, Vanderbilt University **Gerhard Giebisch**, Yale University

STEERING COMMITTEE:

Richard Aldrich, Stanford University David Clapham, Children's Hospital/Harvard Med. School Lily Jan, University of California, San Francisco Olaf Pongs, Institut fur Neurale Signalverarbeitung Francis Ashcroft, Oxford University Fred Sigworth, Yale University Lawrence Palmer, Cornell University

This meeting on the broad topic of K^+ channels will promote dissemination of current and evolving information/trends as well as foster potential interactions among attendees. Focus will be on gating/regulatory and structural/genetic elements of K^+ channels. The involvement of K^+ channels in several inherited diseases will be stressed.

WEDNESDAY, September 22, 1999

Structure of the Potassium Channel Pore Roderick MacKinnon, Rockefeller Institute

THURSDAY, September 23, 1999

High Conductance Ca-Activated Potassium Channels: Structure, Function and Pharmacology G. J. Kaczorowski, Merck Research Laboratories

Session 1: K⁺ Channel Gating

Clay Armstrong, Univ. of Pennsylvania, and Fred Sigworth, Yale Univ.

Speakers: Francisco Bezanilla, UCLA; Richard Aldrich, Stanford Univ.; Colin Nichols, Washington Univ.; David Clapham, Children's Hospital and Harvard Medical School.

Session 2: The Channel Pore

Henry Sackin, Chicago Medical School, and Gary Yellen, Massachusetts General Hospital

Speakers: Benoit Roux, Univ. of Montreal; Hans Oberleitner, Institut fur Physiologie, Munster, Germany; Arthur Brown, Rammelkamp Research Center, Case Western Reserve Univ.; Gary Yellen, Massachusetts General Hospital, Boston; Robert Guy, NIH.

ATP-Sensitive K^+ Channels: Structure, Pharmacology and Function

Frances Ashcroft, Oxford Univ.

FRIDAY, September 24, 1999

The Inward Rectifier K⁺ *Channel Family* **Lily Jan,** UCSF

Session 3: K⁺ Channel-Assocated Protein

Rainer Greger, Univ. of Freiburg, Germany, and Lydia Bryan, Baylor Univ.

Speakers: Jochen Roper, Newham General Hospital, London; David Bredt, UCSF; Joseph Bryan, Baylor Univ.

Session 4: Assembly of K⁺ Channels

Ramon Latorre, CECS, Santiago, Chile, and Lily Jan, UCSF *Speakers:* James S. Trimmer, SUNY at Stony Brook; Diane Papazian, UCLA; Senyon Choe, Salk Institute

Session 5: Channel Regulation

WenHui Wang, Yale Univ., and Peter Ruppersberg, Institute of Physiology, Tubingen, Germany

Speakers: Larry Palmer, Cornell; Steve Hebert, Vanderbilt Univ.; Donald Hilgemann, Univ. of Texas Southwestern.

SATURDAY, September 25, 1999

Knockout/Transgenic Models of Potassium Channel Function **Olaf Pongs,** Center for Molecular Neurobiology, Hamburg

Session 6: K⁺ Channels and Inherited Diseases

David Clapham, Children's Hospital and Harvard Univ., and Michael Bienkowski, Pharmacia and Upjohn *Speakers:* Lydia Bryan, Baylor Univ.; Gerda Breitwieser, Johns Hopkins Univ.; Michael Sanquinetti, Univ. of Utah; Richard Lifton, Yale Univ.

Session 7: Other K⁺ Channels

Walter Stühmer, Max-Planck Institute, and Gary Desir, Yale Univ.*Speakers:* H. Sentenac, Laboratorie de Biochimie et Physiologie Moleculaire des Plantes, Montpellier; Lawrence Salkoff, Washington Univ.; Michael Lazdunski, Institut de Pharmacologie Moleculaire et Cellulaire, Valbonne; John Adelman, Vollum Institute, Portland, OR; Steve Goldstein, Yale Univ.; Nicholas Standen, Univ. of Leicester, UK.

DEADLINES

Abstract Deadline - June 1, 1999 Advance Registration Deadline - August 2, 1999

Conferences

1999 APS Conference

Determinants of Vigilance: Interaction Between the Sleep and Circadian Systems October 19-22, 1999 • Ft. Lauderdale, FL

Radisson Bahia Mar Beach Resort

ORGANIZER:

Allan Pack, University of Pennsylvania

STEERING COMMITTEE:

David Dinges, University of Pennsylvania
H. Craig Heller, Stanford University
Leszek Kubin, University of Pennsylvania
Adrian Morrison, University of Pennsylvania
Amita Sehgal, University of Pennsylvania
Robert Moore, University of Pittsburgh
Fred Turek, Northwestern University
Jerry Siegel, University of California, Los Angeles

This meeting will explore the quantitative nature of the interaction of circadian biology and basic mechanisms of sleep and new potential areas of scientific opportunity. We will examine the neuroanatomical evidence of direct connections between neurons involved in the circadian clock and those involved in the sleep/wake cycle. There will be presentations about how the circadian system affects neuroendocrine function and how such neurohormones might affect sleep. We will address whether the interaction between the circadian and sleep system could occur at the level of regulation of gene transcription.

TUESDAY, October 19, 1999

Evidence for Interaction Between Sleep and Circadian Systems

Robert Moore, Univ. of Pittsburgh

Speakers: Charles Czeisler, Harvard Univ.; Irene Tobler, Univ. of Zurich; Dale Edgar, Stanford Univ.; H. Craig Heller, Stanford Univ..

Molecular Basis of the Circadian Clock Fred Turek, Northwestern Univ. Speakers: Amita Sehgal, Univ. of Pennsylvania; Larry Pinto, Northwestern University; Steven Reppert, Massachusetts General Hospital; Martha Gillette, Univ. of Illinois, Urbana.

WEDNESDAY, October 20, 1999

Mechanisms Controlling Sleep: Networks and Systems Adrian Morrison, Univ. of Pennsylvania *Speakers:* **Robert McCarley**, Harvard Univ.; **Ronald Szymusiak**, UCLA; **Jerry Siegel**, UCLA

Sleep Promoting Factors Alexander Borbely, Univ. of Zurich Speakers: Osamu Hayaishi, Osaka Bioscience Institute; Robert Greene, Harvard Univ.; James Krueger, Univ. of Tennessee, Memphis

Neuroanatomical Basis of Interaction Gene Block, Univ. of Virginia, Charlottesville *Speakers:* **Robert Moore**, Univ. of Pittsburgh; **Clifford Saper**, Harvard Univ.; **Gary Aston-Jones**, Univ. of Pennsylvania

Could Interaction be Neurohormonal or Neurochemical? Irene Tobler, Univ. of Zurich *Speakers:* Alexander Boberly, Univ. of Zurich; Eve van Cauter, Univ. of Chicago; Rae Silver, Columbia Univ.

THURSDAY, October 21, 1999

Possible Molecular Mechanisms of Interaction Steven Reppert, Massachusetts General Hospital/Harvard Univ. *Speakers:* Allan Pack, Univ. of Pennsylvania; David Weaver, Harvard

Consequences of the Interaction Between Circadian and Sleep Systems: Behavior and Vigilance Michael Menaker, Univ. of Virginia, Charlottesville *Speakers:* David Dinges, Univ. of Pennsylvania; Gregory Belenky, Walter Reed Army Institute of Research; Mary Carskadon, Brown Univ.

Consequences of the Interaction Between Circadian and Sleep Systems: Other Systems Charles Czeisler, Harvard Univ. *Speakers:* Virend Sommers, Univ. of Iowa; Janet Mullington, Harvard Univ.; Steven Shea, Harvard Univ.

Panel Discussion: Where Do We Go From Here? Allan Pack, Univ. of Pennsylvania **Gary Aston-Jones,** Univ. of Pennsylvania; **Gene Block,** Univ. of Virginia, Charlottesville; **Michael Menaker,** Univ. of Virginia, Charlottesville; **Jerry Siegel,** UCLA; **Fred Turek**, Northwestern Univ.

DEADLINES

Abstracts Deadline - July 16, 1999 Advance Registration Deadline - August 30, 1999

FASEB Executive Director

Executive Director: The Federation of American Societies for Experimental Biology (FASEB) invites applications and nominations for the position of Executive Director to begin service on or after June 1, 1999.

The mission of FASEB is to enhance the ability of biomedical and life scientists to improve, through their research, the health, well-being, and productivity of all people. FASEB is a coalition of independent Member Societies that represents the interests of biomedical and life scientists, particularly those related to public policy issues. FASEB facilitates coalition activities among Member Societies and disseminates information on biological research through scientific conferences and publications. FASEB also offers Member Societies headquarters facilities and operational and logistic support.

Founded in 1913, FASEB now includes 17 biomedical and life science societies with an aggregate membership of more than 52,000 scientists. Located on a campus of approximate-ly 11.5 acres in Bethesda, Maryland, the facilities include 128,000 square feet of office accommodation and a conference center accommodating meetings of up to 150 participants. A plan to explore expansion of the facilities by new construction providing 42,000 additional square feet of office space has been approved.

The Executive Director reports directly to the President and Board of Directors and serves as the Chief Operating Officer of FASEB, providing leadership and direction to approximately 110 professional, technical, and clerical support staff and managing an annual operating budget of approximately \$14 million. The primary responsibilities of the Executive Director include recruitment and direction of key staff, management of resources to ensure required support for the programs and activities of the Member Societies, development of new facilities to ensure that the services provided by FASEB remain at the leading edge of technology, oversight of public policy issues, and maintenance of an effective coalition through liaison with various Member Society staffs. Qualified applicant should have executive/administrative experience in planning and resource allocation with a record of achievement and leadership in management of academic, association, or other nonprofit organizations. The Executive Director must have the ability to work in a multi-centered environment, a commitment to coalition building, an interest in the applications of technology to the management of associations, and familiarity with public policy issues of importance to biomedical and life scientists. Qualified candidates should send resume with covering letter in confidence by March 15, 1999 to: William R. Brinkley, PhD, FASEB President, Attn: Human Resources, 9650 Rockville Pike, Bethesda, MD 20814. Fax: 301-571-0684. [EOE]

APS Publications Manager (Director of Publications)

Publications Manager (Director of Publications): The American Physiological Society seeks an experienced individual to manage all of the Society's prestigious print and online peer-reviewed biomedical journals, including the 10 monthly research journals and 2 review journals, totaling almost 40,000 pages. The Publications Manager serves as the chief liaison to the Publications Committee, Journal Editors, and Editorial Boards and prepares an annual report for Council. The Publications Manager also acts as liaison with Oxford University Press in the management of the Society's book program. Candidates must have significant experience (5-10 years) in the management of peer-reviewed medical/biomedical journals; working knowledge of electronic publishing; comprehensive understanding of editorial services required for manuscript review, tracking, copy edit

ing, and composition; experience with production services and contracts required for a major publication; an understanding of ethical standards in the field of biomedical publishing; and experience in the financial management and budgetary requirements associated with a major publication program. Demonstrated management experience required for the supervision of a 40-person staff. Excellent communications, writing/editing, computer, and management skills required. Competitive salary and excellent benefits and work environment are offered. Travel (domestic and foreign) is required at publications/journal-related meetings. Deadline for applications is March 1, 1999. Send resume and cover letter, including salary requirement to: FASEB, Human Resources, 9650 Rockville Pike, Bethesda, MD 20814. Fax: 301-571-0684. [EOE]

Postdoctoral/Research Associate Positions: Two NIH- and AHA-supported postdoctoral or research associate positions are available to study the molecular mechanism(s) of complement activation following ischemia and reperfusion injury. Successful candidates must have a PhD and have experience in protein biochemistry and/or molecular biology. Experience in epitope mapping, DD-RT-PCR, and/or cloning are desired. Positions will remain open until filled. Please submit a curriculum vitae and the names of three references to: Gregory L. Stahl, PhD, Center for Experimental Therapeutics and Reperfusion Injury, Anesthesia, Brigham and Women's Hospital, Harvard Medical School, 75 Francis Street, Boston, MA 02115. Fax: 617-278-6957.

Dean, School of Health Related Professions: The University at Buffalo, State University of New York, invites nominations and applications for the position of Dean of the School of Health Related Professions. The preferred starting date is July 1, 1999. Reporting to the Vice President for Health Affairs and to the Provost, the Dean is responsible for the academic and administrative leadership of three departments with 39 full-time faculty members, 550 students, and a total annual budget of approximately \$4 million. In addition the Dean will be responsible for representing the School to the university and its individual constituencies in Western New York and particularly those in the City of Buffalo. Candidates should have earned a doctorate in a health-related profession and be eligible for a faculty appointment at the level of Professor with tenure. Candidates should possess successful administrative experience and interests related to organizations and/or educational programs in university settings, including personnel and financial management; commitment to excellence in teaching, research, and service; knowledge of and commitment to interdisciplinary collaboration and to urban issues associated with the health-related professions; excellent communication and human relations skills; commitment to student achievement and faculty development; a record of intellectual contributions to a health-related discipline; and evidence of effective community involvement and innovative leadership. Compensation is competitive. Review of applications will begin on March 1, 1999 and continue until the position is filled. The applicant should submit a resume accompanied by the names, telephone and fax numbers, and email addresses of three references to: Lawrence Shulman, MSW., EdD, Search Committee Chair, Professor and Dean, School of Social Work, 359 Baldy Hall, State University of New York at Buffalo, Buffalo, NY 14260-1050 (http://wings.buffalo.edu/ academic/department/hrp). We encourage applications from minority and women candidates and from professionals with disabilities. [EOE/AA]

Postdoctoral Position: An NIH-supported position is available to study regulation of ion transport in gastrointestinal epithelia using patch-clamp and imaging techniques. Experience with either patch-clamp recording or imaging of fluorescent dyes is preferable. The Department of Physiology and Biophysics at Wright State University offers an excellent training environment, providing interactions with related labs studying ion channel/transporter structure and regulation. Interested persons should send a curriculum vitae, including a statement of your research interests, along with names and addresses of 3 references to: Dan R. Halm, PhD, Wright State University, Department of Physiology and Biophysics, 3640 Colonel Glenn Hwy, Dayton OH 45435. FAX: (937) 775-3769. E-mail: dan.halm@wright.edu Review begins 1/8/99. [EOE/AA]

Postdoctoral Position Available: NIH Intramural Training Award or Visiting Fellow at the National Institute of Environmental Health Sciences, Laboratory of Pharmacology and Chemistry (LPC), Research Triangle Park, NC, in the laboratory of Dr. John B. Pritchard, Chief, LPC. The position is available as of January 1, 1999. Salary is based on experience: new PhDs, \$26,500/yr; previous postdoctoral experience, range increases by \$1,500 for each year of relevant postdoctoral experience. The position is open to applicants with a PhD, MD, DVM, etc., and less than 5 years of postdoctoral experience. Research focus is on the mechanisms and energetics of renal organic anion and cation secretory systems. These systems are critical in protection against the toxic effects of many xenobiotics, including drugs, environmental chemicals, and their metabolites. Current emphasis is on the regulatory control of transport; coordination of basolateral, luminal, and intracellular events during secretion; and the molecular biology of these systems. Techniques routinely used in the laboratory include isolated membrane vesicles, cultured cells, molecular biology, and imaging. Current emphasis is on the molecular characterization of transport proteins responsible for drug and xenobiotic elimination (e.g., J. Biol. Chem. 272: 30088-30095, 1997). Comparative models from crustaceans and teleost fish are used in addition to standard mammalian model systems. See Physiol. Rev. 73:765-796, 1993 for summary of research in this area. Specific requirements: training and experience in molecular biology is expected; knowledge of the physiology and biochemistry of membrane transport is preferred. Send inquiries (include curriculum vitae and summary of research interests) to: Dr. John B. Pritchard (MD F1-03), National Institute of Environmental Health Sciences, Laboratory Pharmacology and Chemistry, Research Triangle Park, NC 27709. Fax: 919-541-3757; email: pritchard@niehs.nih.gov.

Cardiovascular Research Associate Position: Full-time position available at the University of South Florida College of Medicine in Tampa, FL. The position is available in a multidisciplinary cardiovascular research laboratory with interests in the effects of neuropeptides, natriuretic peptides, and allosteric enhancers of adenosine receptor agonists. A PhD or extensive experience in cardiovascular physiology is required. Submit resume and the names of three references to Dr. Robert J. Henning, c/o Cardiovascular Research Group (Robert J. Henning, Ray Olsson, David L. Vesely), University of South Florida College of Medicine, 12901 Bruce B. Downs Blvd., MDC 19, Tampa, FL 33612. Tel: 813-978-5873; TDD: 813-974-2218; fax: 813-978-5884. Position is to be filled on or before June 30, 1999. This is a nontenure position. [EO/EA/AA]

Postdoctoral position: A postdoctoral position is available immediately under the direction of Harold Schultz in the Department of Physiology and Biophysics at the University of Nebraska Medical Center to study cardiovascular reflexes in animal models of heart failure. Emphasis is placed on electrophysiological measurements of chemoreceptor and sympathetic nerve activities and ion channel function in glomus/nerve cells. Applicants should have a PhD in physiology, cell or molecular biology, or related fields and have no more than five years of postdoctoral experience. Salary will be commensurate with experience. Please send curriculum vitae and names of three references to: Harold D. Schultz, PhD, Department of Physiology and Biophysics, University of Nebraska Medical Center, 984575 Nebraska Medical Center, Omaha, NE 68198-4575. Minorities and women are encouraged to apply. [EOE/AA]

Postdoctoral Research Associate: A postdoctoral position, funded by a grant-in-aid from the American Heart Association (national), is now available to investigate pacemaker mechanisms in the sinoatrial node. The position is funded for 3 years at a beginning salary of \$27,000 plus \$8,505 in fringe benefits. After 2 years, the position can be upgraded to Research Instructor in the Department of Physiology if, at that time, the applicant chooses to apply for his/her own research grant. The goal is to determine the mechanisms that underlie ischemia-induced changes in spontaneous electrical activity. Single pacemaker cells are isolated from the rabbit sinoatrial node and, after 1-4 days in culture, are exposed acutely to ischemic-like conditions. Measurements of either membrane potential or transmembrane currents, simultaneously with Indo-1 or SNARF-1 fluorescence, are used to correlate alterations of electrophysiological properties with the elevation of intracellular Ca or H. A set-up for such measurements is available full-time. The applicant will also have access to a BioRad 1024 confocal microscope with a flash photolysis attachment as well as facilities for molecular biology procedures in the Department of Physiology. For more information, visit http://phy025.lubb. ttuhsc.edu. Applicants should have a PhD and/or MD as well as considerable experience with whole cell patch-clamp techniques (preferably perforated patch). Applicants should send a curriculum vitae, a description of research interests and experience with electrophysiological techniques (1-2 pages), and the names and addresses of three references to: Richard D. Nathan, PhD, Department of Physiology, Texas Tech University Health Sciences Center, 3601 Fourth Street, Lubbock, TX 79430. Tel: (806) 743-2536; fax: (806) 743-1512; email: phyrdn@ttuhsc.edu.



Tenured/Tenure-Track Position in Muscle and Motility: The Laboratory of Physical Biology at the National Institute of Arthritis and Musculoskeletal Skin Diseases, National Institutes of Health invites applications to a tenure-track or tenured Investigator position. Candidates should have a PhD or MD degree with at

least three years of postdoctoral experience and an exceptional publication record. We are seeking an independent and interactive individual who applies modern molecular, cellular and genetic techniques to the investigation of fundamental problems in development and cell biology of muscle and motile systems. We wish to complement LPB's existing strength in the biophysics, biochemistry and cell and molecular biology of muscle systems. The appointee is expected to establish a vigorous research program and to participate in the mentoring of postdoctoral fellows. The newly renovated LPB has state of the art research core facilities and a dynamic research environment. Excellent opportunities exist for strong collaborations with other intramural biomedical and clinical scientists. LPB will move into a new research building in year 2000. Candidates should forward their curriculum vitae, names of three references and a brief statement of future research plans to: Linda Peterson, Secretary to Scientific Director, NIAMS, NIH, Building 10, Room 9N228, 9000 Rockville Pike, Bethesda, MD 20892-1820. The deadline of application is March 1,1999. [EOE]

Faculty position in integrative biology (functional analysis of genetically engineered animals): The Department of Physiology at the University of Michigan seeks to recruit a tenure-track, junior faculty member who uses modern tools of genetic engineering (gene targeting/transgenesis/gene transfer) to study physiological processes in the context of the whole animal. The new faculty member will also contribute to the teaching mission of the department. In addition to a competitive start-up package, the successful candidate will play an important role in a new interdepartmental Center for Integrative Biology and also compete for a position in the University of Michigan's Biological Scholars program (see Nov. 20 issue of Science). Applicants should send 1) a summary of research accomplishments and future plans, 2) a curriculum vitae, and 3) arrange for three letters of reference sent to: Chair: Integrative Biology Search, Department of Physiology, 7744 Medical Science II, University of Michigan, Ann Arbor, MI 48109-0622. [EOE/AA]

Assistant Research Scientist: The University of Iowa College of Medicine, Department of Internal Medicine, Cardiovascular Diseases Division is seeking an Assistant Research Scientist to perform basic research to advance knowledge of cellular and molecular mechanisms involved in the function of baroreceptor and cardiac neurons and to map the neuroanatomical pathways of these neurons in vivo. The work will require expertise in the theoretical and methodological aspects of cellular electrophysiology and confocal microscopy. This position requires a PhD or professional equivalent. A PhD degree in neuroscience and/or physiology and research experience in the area of cystic fibrosis, cellular electrophysiology, neuroanatomical tracing methods, and confocal microscopy are desirable. Please send resume and cover letter indicating #39254 to: Carol Wehby, Human Resources, Internal Medicine, E400 GH, 200 Hawkins Drive, Iowa City, IA 52242-1081. Women and minorities are strongly encouraged to apply. [EOE/AA]

Postdoctoral Fellowship in Somatosensory Neurophysiology: A postdoctoral fellowship position is available immediately in the somatosensory neurophysiology laboratory, Program in Biomedical Engineering, School of Medicine, SUNY at Stony Brook. The research is funded by The Whitaker Foundation to study how populations of cutaneous neurons encode noxious and non-noxious mechanical stimuli. Singleunit recordings are made from isolated peripheral nerves in a rat model. Mechanical stimuli are produced by a computercontrolled apparatus that stretches and/or compresses the skin. Additional activities include immunohistochemistry procedures to identify integrin connections between terminal endings of neurons and extracellular matrix components and recording from muscle nociceptors in a isolated musclenerve preparation. The successful candidate will possess a PhD, MD, DVM, or the equivalent and have a background in electrophysiological recording from axons of single neurons. Any engineering training will be a plus, as will experience in small animal surgery, computer programming, and immunohistochemistry. Send a letter of interest, curriculum vitae, and the names of three references to: Partap S. Khalsa, DC, PhD, Program in Biomedical Engineering, SUNY at Stony Brook, HSC T18-030, Stony Brook, NY 11794-8181. Tel: 516-444-2457; email: partap.khalsa@sunysb.edu.

Tenure-Track Faculty Positions: Applications are invited for tenure-track positions in the Department of Physiology and Biophysics at the University of Mississippi Medical Center. Applicants will be considered at ranks of assistant, associate, or full professor and must have a PhD and/or MD degree with appropriate postdoctoral research experience. Special consideration will be given to candidates with strong backgrounds in molecular and/or cellular physiology and research interests that complement existing areas of excellence in cardiovascular, renal, and neuroendocrine physiology or the pathophysiology of hypertension and vascular disease. The successful candidate is expected to develop a nationally recognized research laboratory supported by extramural funding and to contribute to the teaching and service missions of the department. The large group of cardiovascular scientists in the department offer excellent opportunities for collaboration at the molecular, cellular, or systems levels of integration. For more information, the department Web site can be accessed at http://phys-main.umsmed.edu. Applicants should send a curriculum vitae, a statement of research interests and career goals, and the names of at three references to: John E. Hall, PhD, Department of Physiology and Biophysics, University of Mississippi Medical Center, Jackson, MS 39216-4505. [M/F/D/V] [EOE]

Professor, **Physiology/Biophysics:** The Assistant Department of Physiology and Biophysics at the University of Nebraska Medical Center invites applications for a tenureleading faculty position at the Assistant Professor level. We seek an individual who will complement an existing faculty involved in various aspects of cardiovascular physiology with emphasis on neural control of the circulation and/or endothelial/smooth muscle function at the cellular and molecular levels. The candidate should possess a doctorate and at least two years of postdoctoral experience. Evidence of extramural support will be an important consideration. The successful candidate will join a department composed of 11 full-time faculty. He/she will be expected to establish a research program and teach in one of our physiology courses to either medical or allied health students. We offer significant laboratory space and a competitive salary and set-up package. Please send by March 1, 1999 a curriculum vitae, statement of research goals, and names of three references to: Steven C. Sansom, PhD, Chair of Search Committee, Department of Physiology and Biophysics, University of Nebraska Medical Center, 984575 Nebraska Medical Center, Omaha, NE 68198-4575. Minorities and women are encouraged to apply. [EOE/AA]

Postdoctoral Research Associate: Position is available in the Department of Nutrition, University of California, Davis, starting in March of 1999 with research group investigating regulation of leptin production (see Endocrinology 139: 551-558, 1998) and the role of dietary macronutrient content and composition in the pathophysiology and treatment of obesity and diabetes. The primary focus of the work will be to investigate the role of adipocyte metabolism in regulating leptin expression and secretion in vitro, but there will be opportunities for participation in experiments conducted in animals and clinical studies in human subjects. Education, experience, and skills required include a doctorate in physiology, endocrinology, nutrition, biochemistry, or cell biology. The position requires experience with molecular biological techniques. Prior experience working with adipocytes and knowledge of adipocyte biology is highly desirable. Strong written and verbal communication skills are essential. Due to funding constraints, applicant must be a US citizen or resident. Interested applicants should send, fax, or email a curriculum vitae; a description of research experience and interests; pertinent reprints; and the names, addresses, and phone numbers of three professional references to: Peter J. Havel, DVM, PhD, Department of Nutrition, University of California, Davis, One Shields Avenue, Davis, CA 95616. Fax: 530-752-1297; email: pjhavel@ucdavis.edu.

Associate Director Position: The Cardiothoracic Research Laboratory of Carlyle Fraser Heart Center of Emory University in Atlanta, Georgia, is seeking an Associate Director with faculty appointment at the Associate Professor or Professor level commensurate with experience. Applicants should have a PhD, MD, or equivalent with experience in cardiovascular physiology, pharmacology, vascular biology, or immunology-molecular biology. Candidate should be an established investigator in the areas of surgical or nonsurgical myocardial ischemia-reperfusion, cardioprotection, and cardiopulmonary bypass physiology as confirmed by publication record. A track record in grant support is necessary; currently active grants/contracts support is highly desirable. Candidate will work closely with clinical cardiothoracic surgery program. Send a curriculum vitae to J. Vinten-Johansen, PhD, Director, Cardiothoracic Research Laboratory, Carlyle Fraser Heart Center, 550 Peachtree Street NE, Atlanta, GA 30356. Email: jvinten@emory.edu.

Two Tenure-Track Faculty Positions: The Department of Physiology, Queen's University (http://meds.queensu.ca/ medicine/physiol/) invites applications for two tenure-track positions in physiology at the Assistant or Associate Professor level. Candidates should have expertise in cardiopulmonary physiology or neuroscience. Requirements include a PhD or MD degree, outstanding scholarship, a strong record of achievement, and the potential to attract external funding. Applicants at the Associate Professor level will be expected to hold national research funding and display strong potential to obtain career awards at the national or provincial level. The Department's current research strengths lie primarily in neuroscience and cardiopulmonary physiology, and candidates should preferably complement these strengths. Queen's University is recognized nationally for the quality of its undergraduate and graduate programs, which attract outstanding students. Kingston is a vibrant community of approximately 150,000, which is situated on the shores of Lake Ontario at the mouth of the St. Lawrence River. The University and the region offer an outstanding academic and community environment (http://www.queensu.ca). In accordance with Canadian Immigration requirements, this advertisement is directed towards Canadian citizens and permanent residents. Queen's University has an employment equity program and encourages applicants from all qualified candidates including women, aboriginal people, people with disabilities, visible minorities, gay men, and lesbians. The deadline for applications is March 15, 1999. Applicants should forward a copy of the curriculum vitae and names of three referees to Dr. A.V. Ferguson, Professor and Head, Department of Physiology, Queen's University, Kingston, Ontario, K7L 3N6, Canada.

Mylan Department Chair and Professor: The School of Medicine of the Robert C. Byrd Health Sciences Center of West Virginia University seeks a Chair of the Department of Pharmacology and Toxicology. WVU, a comprehensive, public, Carnegie Research I University, is the flagship university for the state of West Virginia. WVU is located in Morgantown, a vibrant community in north central West Virginia. Residents of Morgantown enjoy the benefits of living in a city ranked third among most livable small cities in the United States. Candidates should be a senior scientist with a PhD and/or MD and have a distinguished record of research productivity, the capacity to maintain a robust extramurally-funded research program, and a commitment to professional and graduate education. We welcome applicants from all areas of pharmacology or toxicology; however, it is anticipated that the greatest growth potential exists in enhancing the research mission of the Mary Babb Randolph Cancer Center or the field of neurosciences. The department is one of five basic science departments in the School of Medicine-all of which have strong research programs. The department has 12 primary faculty members as well as several adjunct and secondary faculty members. The department has a strong record of training PhD students and has had an NIH training grant for over 30 years. Candidates are encouraged to visit the department's web site for additional information about the department at http://www.hsc.wvu.edu/som/ pcol_tox/pcoltox.htm. The successful candidate will have the opportunity to guide the department in its role in the implementation of a new medical school curriculum as well as the department's research program. This search will remain open until filled; however, screening of applications will begin on February 15, 1999. Applicants should submit a curriculum vitae, statements of research interests and administrative philosophy, and the names and addresses of at least three references to: John B. Barnett, PhD, Professor and Chair, Department of Microbiology and Immunology, c/o Susan Jackson, School of Medicine, PO Box 9000, West Virginia University, Morgantown, WV 26506-9000. Women and minorities are encouraged to apply. [AA/EOE]

Assistant Professor in Physiology: The Biology Department invites applications for the above full-time, tenure-track position (pending budgetary approval). Primary teaching responsibilities will be in human physiology; may develop courses in a specialty such as comparative physiology, pathophysiology, or neuroscience. Required: PhD in the biological sciences and demonstrated ability to maintain an ongoing research program suitable for undergraduate/graduate student participation. Preferred: College teaching experience and familiarity with allied health programs. Applications must be received by February 15, 1999. Mail or fax cover letter stating teaching and research interests (email not accepted), resume, and three letters of reference to: Office of Human Resources, Rhode Island College, 600 Mt. Pleasant Ave., Providence, RI 02908, Attention: Physiology Search. Fax: 401-456-8717; TDD#: 401-456-8216; Internet: http://www.ric.edu. [AA/EOE]

Postdoctoral Position: A postdoctoral position is available immediately in the Intracellular Regulation Section of the Laboratory of Pharmacology and Chemistry at the National Institute of Environmental Health Sciences, NIH (Research Triangle Park, NC). Our research is focused on mechanisms of drug transport in kidney, liver, and brain capillary endothelium (see, e.g., Physiol. Rev. 73:765-796, 1993; Am. J. Physiol. 275:F785-F795, 1998). The ideal candidate would have a background in membrane transport or renal cell physiology and an interest in learning and applying confocal imaging-based techniques to problems concerned with the cellular and molecular biology of transport and its regulation by xenobiotics, hormones, and intracellular mechanisms. Salary is based on experience, beginning at \$26,500/year for new PhDs. The position is open to applicants with a PhD, MD or DVM and less than 5 years of postdoctoral experience. Interested applicants should send or e-mail a curriculum vitae, a description of research experience and interests and the names, addresses, and phone numbers of three professional references to: Dr. David S. Miller, LPC, NIEHS, PO Box 12233, Research Triangle Park, NC 27709. Fax: 919-541-1898; email: miller@niehs.nih.gov.

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If you would like to have your ad listed in *The Physiologist* or on the APS Career Opportunities Web page, the following items are needed: a copy of the ad, the name of a contact person, and either a purchase order number, credit card number (with expiration date and name of cardholder), or billing address. Send the information to Melinda Lowy (e-mail: mlowy@aps.faseb.org; phone: 301-530-7165; fax: 301-571-8305).

Assistant Professor (Mammalian Anatomist/Physiologist): The Biology/Microbiology Department at South Dakota State University invites applicants for a tenure-track, 9month, 100% academic programs-funded appointment with research expectations. Instructional responsibilities include mammalian anatomy, other courses as needed, and the development of upper-level undergraduate and/or graduate courses in the applicant's area of expertise. Development of a collaborative research program and pursuit of extramural funding is expected. Earned PhD, DVM, or equivalent degree in anatomy, physiology, or a closely related area and collegiate teaching and postdoctoral research experience are required. Preference will be given to candidates with demonstrated effectiveness in teaching and high productivity in research, particularly in the areas of gastrointestinal and/or respiratory physiology using animals compatible with SDSU facilities (e.g., farm animals, rabbits, and rodents). Extramural funding experience, the potential and willingness to develop collaborative teaching and research programs with other SDSU faculty, and effective interpersonal and communication (verbal and written) skills desired. Send letter of application, curriculum vitae, separate statements of teaching and research interests, and documentation of qualifications related to the position's expectations and have three current letters of professional reference sent to: Dr. Mike Hildreth, Department of Biology and Microbiology, South Dakota State University, Box 2014D, Brookings, SD 57007. Tel: 605-688-4562 (ADA: 605-688-4493/TTY 605-688-4394). Call or write for additional information. Review of applications will start March 1, 1999, and the position will remain open until filled. Starting date is negotiable. SDSU encourages applications from women and minorities. [AA/EOE]

Cardiac Gene Transfer Postdoctoral Fellows: Our laboratory uses DNA viral vectors for studies on cardiac function in vitro and in vivo. We seek individuals with demonstrated interests in heart or skeletal muscle and with expertise in the molecular, biochemical, biophysical, or physiological sciences to join our research group. Applicants should send *1*) a one-page summary of research accomplishments and career goals, *2*) a curriculum vitae, and *3*) the names of three references to: Dr. Joseph M. Metzger, Department of Physiology, 7730 Medical Science II, University of Michigan, Ann Arbor, MI 48109-0622.

Postdoctoral Position: NIH-supported postdoctoral positions are available to study mechanisms of defibrillation and impulse conduction in the heart in vitro using voltage-sensitive dyes and high-resolution fluorescent imaging techniques. Experience with imaging of fluorescent dyes and/or real-time data acquisition is preferable. The Department of Cardiology of the Cleveland Clinic Foundation offers an excellent training environment, providing interactions with clinical and research staff. Top applicants may compete for a three-year fellowship, which pays \$32,000/year for the first year. Interested persons should send a curriculum vitae, including a statement of your research interests, along with names and addresses of 3 references to: Igor R. Efimov, PhD, Desk FF1, Department of Cardiology, Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, OH 44195. Tel: 216-444-5918; fax: 216-445-4167; email: efimov@ieee.org; Internet: http://www.ccf.org/pc/basicep/efimov. Women and minorities are encouraged to apply. [EOE/AA]

Research Fellowship Opportunities in Japan and Korea for U.S. Scientists Graduate Student, Postdoctoral and Senior Fellowships in Science and Engineering

The National Science Foundation (NSF) sponsors long- and short-term scholarly visits by US researchers to universities, research institutes, national laboratories, public corporations, and non-profit research organizations in Japan and Korea.

Available programs include: Senior Research Fellowships Cooperative Research Programs Postdoctoral Research Fellowships Dissertation Enhancement Awards Graduate Student Summer Institutes

For complete information and eligibility requirements: Office Visit the NSF Tokyo Web site at: http://www.twics.com/~nsftokyo/ Or contact: Japan and Korea Program **Division of International Programs** National Science Foundation 4201 Wilson Boulevard Arlington, VA 22230 Telephone: 703-306-1701 E-mail: JKPinfo@nsf.gov

Deadline: Deadlines are several throughout the year.

People & Places

Kandel to Receive Wolf Prize in Medicine

The 1999 Wolf Prize in Medicine will be awarded to Vienna-born Professor Eric Kandel, 69, of Columbia University, New York, for "the elucidation of the organismic, cellular and molecular mechanism, whereby short-term memory is converted to a long-term form." The prize will be conferred by the President of the State of Israel, Mr. Ezer Weizman, in a special ceremony, at the Knesset (parliament), on Sunday, May 2, 1999.

How learning occurs and memory is stored is one of the major questions central to both neural science and cognitive psychology. Kandel has helped demystify the study of learning and memory storage by delineating the molecular mechanisms underlying these processes. In so doing, he has discovered the molecular switch whereby labile shortterm memory is converted into stable long-term memory maintained by structural changes.

Kandel's contribution stands as the single most important advance in bridg-

ing molecular neurobiology to behavior. He has shown how the methods of psychology can be merged with those of



Eric Kandel

biology to endow the study of behavior and learning with renewed vigor and explanatory power. His work has influenced the way both biology and psychologists now think about these processes. Kandel received his BA degree from Harvard University and his MD degree from New York University. Kandel has been associated with Columbia University since 1974. He is currently University Professor in the Center for Neurobiology and Behavior at the Psychiatric Institute and a Senior Investigator at the Howard Hughes Medical Institute.

The Wolf Prize was established in 1978 by the late German-born Ricardo Wolf, who lived in Cuba for many years and served as Fidel Castro's ambassador to Israel. The Israel-based Wolf Prize is awarded to outstanding scientists and artists, "for achievement in the interest of mankind and friendly relations among peoples." The annual prizes, of \$100,000 in each area, are given in four out of five scientific fields, in rotation: Agriculture, Chemistry, Mathematics, Medicine, and Physics. In the Arts, the Prize rotates among Architecture, Music, Painting, and Sculpture. 🔹

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People & Places

Tracy L. Baker is currently a Doctoral Candidate in the Department of Comparative Bioscience, University of Wisconsin, Madison, WI. Prior to her moving to Wisconsin, Baker was a Graduate Research Assistant, Department of Biology, Arlington, TX.

Having moved from the Panum Institute, University of Copenhagen, Copenhagen, Denmark, **Peter Bie** is now affiliated with the Department of Physiology, Odense University, Odense, Denmark.

Josephine P. Briggs has recently affiliated with the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD. Previously, Briggs was with the Departments of Internal Medicine and Physiology, University of Michigan, Ann Arbor, MI.

Shyamal Das was formerly with the Department of Pharmacology and Toxicology, University of Kansas, Lawrence, KS. Das recently affiliated with the Department of Infectious Diseases, City of Hope National Medical Center, Bellevue, WA.

Now President of TMG Consulting, Mobile, AL, **Thomas M. Glenn** was formerly President of the University of South Alabama College of Medicine, Mobile, AL.

Guy Groblewski has moved from the Department of Physiology, University of Michigan Medical School, Ann Arbor, MI. Groblewski is now with the Department of Nutritional Sciences, University of Wisconsin, Madison, WI. Formerly a Postdoctoral Fellow with Veterinary Biomedical Sciences, University of Missouri, Columbia, MO, **Jeffrey Lee Jasperse** is now a Postdoctoral Fellow with the Department of Physiology, University of Virginia, Charlottesville, VA.

David L. Kreulen, Van Liere Professor and Chairman, recently joined the Department of Physiology, Michigan State University, East Lansing. MI. Kreulen was previously associated with the Department of Physiology, West Virginia University, Robert C. Byrd Health Science Center, Morgantown, WV.

Previously a Research Assistant Physiologist, **Yunn-Hwa Ma** was associated with the General Clinical Research Center, University of California, San Francisco, CA. Recently, Ma has joined the Department of Pharmacology, Chang Gung University, Tao-Yuan, Taiwan.

Thomas V McCaffrey has moved from the Department of Otolaryngology, Mayo Clinic, Rochester, MN and has joined the Department of Otolaryngology-Head and Neck Surgery, University of South Florida College of Medicine, Tampa, FL.

Silvana S. Meyrelles has moved from the Cardiovascular Center, Hospital Clinics, University of Iowa, Iowa City, IA. Meyrelles is currently with the Department of Physiological Science, Fed U. Espirito Santo, Vila Velba, Brazil.

Recently, **Robert S. Moreland** affiliated with the Department of Physiology, Hahnemann University, Philadelphia, PA. Prior to his new position, Moreland was with the Department of Physiology, Allegheny University, Philadelphia, PA. **Jorgen S. Petersen** is now Division Director of Pharmacology, Zealand Pharmaceutical, Horsholm, Denmark. Petersen was formerly Head of Turbinevej, Hellebaek, Denmark.

Moving from the Division of Cardiology, Wayne State University School of Medicine, Detroit, MI, **Jun Ren** has affiliated with the Department of Physiology, University of North Dakota School of Medicine, Grand Forks, ND.

Arthur M. Spanier, now a Research Chemist and Physiologist, Meat Science Research Laboratory, United States Department of Agriculture, Beltsville, MD, has moved from the Southern Regional Research Center, USDA Agricultural Research Service, New Orleans, LA.

Jean-Pierre Valentin was formerly a Research Scientist, Division of Cardiovascular Disease, CRPF, Castres, France. Recently, Valentin joined the Head Department of Safety Pharmacology, Astra Charmwood Safety Assessment, Loughborough, UK.

Robert M. Winslow has accepted the position of CEO of Sangart Inc., La Jolla, CA. He is no longer affiliated with Veteran Affairs Medical Center, San Diego, CA.

Baozhi Yuan has moved from the Department of Physiology, the University of Hawaii Manoa, Honolulu, HI, to the Department of Physiology, Medical College of Wisconsin, Milwaukee, WI.

APS Society Mixer Saturday, April 17, 9:00 PM Enjoy sumptuous desserts and dance to the music of "Jnvitation." Grand Hyatt, Constitution B/C

Letter to Stephen Cain

Masao Ito writes: "Thank you very much for your letter and for inviting me to write about myself as a senior physiologist born in 1928. Indeed, I celebrated my 70th birthday on December 4, 1998. As many of my contemporaries, I am still very well and keeping my activity.

"Ten years ago, I retired from the University of Tokyo at the age of 60, and then found my second scientific life in the Institute of Physical and Chemical Research (abbreviated from its Japanese name as RIKEN), established in 1971 and located in Wako, a suburb of Tokyo. Presently, I am the director of the Brain Science Institute which was opened within RIKEN in October 1997 (RBSI, see Science 275: 1562-1563, 1997). RBSI has several unique features such as close transdisciplinary collaboration between basic, clinicopathological, and computational research fields, openess to the world (30% of researchers come from dominance of abroad), voung researchers, and emphasis on both scientific discovery and technological innovation.

"Even though I am busy in directing RBSI, I am lucky enough to maintain a laboratory. With 11 colleagues, I still pursue the neuronal mechanisms and functional roles of the cerebellum by combining electrophysiology, molecular biology, biochemistry and behavioral studies. Facilities of the laboratory are excellent, and if there is any young researcher interested in this field, please don't hesitate to ask me (email: masao@postman.riken.go.jp).

"I finished my duty of president for the IUPS in 1997, and also for the FAOPS (Federation of Asian Oceanian Physiological Societies) in 1998, but still serve as president of FAONS (Federation of Asian Oceanian Neuroscience Societies) until the year 2000. I have enjoyed being involved in these international activities very much, but now I shift the focus of my commit-



ment to bilateral collaborations between our RBSI and other laboratories.

"My autobiography has appeared in The History of Neuroscience in Autobiography (Vol. 2, 1998, ed. L.R. Squire, Academic Press) in which I reviewed major events in my life. I started my career at the time of the epoch-making technological innovation with glass microelectrodes, and had an exciting postdoc training in cellular neurophysiology in the laboratory of John Eccles who first applied this technology to central neurons. My experience then impressed on me the importance of new technology as a prerequisite to scientific discoveries. The subsequent 30 years I spent at the University of Tokyo were also full of thrills such as findings of inhibitory action of Purkinje cells, cerebellar adaptation of vestibuloocular reflex and long-term depression. My experience in these years impressed on me the importance of working hypotheses in leading us to scientific discoveries.

"Looking toward the 21st century, the importance of physiology in clarifying mechanisms of living bodies including our brain is ever increasing. I wish that challenges will be made in physiology with the introduction of new technology and new working hypotheses.

"I hope that this letter will be of some interest for readers of *The Physiologist.*"

Letters to Robert Berne

Grover Pitts writes: "Since retiring I have published two papers, one from date collected before retirement and the other from library research. I have done some peer reviewing of manuscripts in the Gravitational Physiology Section. I have also participated in the discussion

of physiologic and environmental topics via letters to the editors of *The FASEB Journal* and national newspapers.

"My non-physiological activities have been diverse. I invest many profitable hours in our wildflower garden. I play an active role in our Retired Faculty Association. We travel for fun and go bird-watching several times a year and also participate in family outings to the beach and mountains. Over the years I have purchased books and put them on the shelf thinking 'I'll read that during retirement,' and now I'm doing it.

"I recommend active retirement to everyone. It gets you some (undeserved) attention, such as an 80th birthday party by 30 friends. My retirement is especially enriched by puttering around with my great-grandson."

Daniel Stone writes: "I became emeritus at New York Medical College in 1990, but continued to teach for another year. I miss the stimulus and intellectual give and take of student and postdoctoral teaching.

"However, my many interests keep me busy and content. Photography, the computer and love of nature have filled the gap. I am actively working with anti-smoking coalitions, and have lectured to youngsters about tobacco. I have also worked with the Lung Association, to present scientific programs, and to review grants."

Glenn A. Langer writes: "It has been awhile and it was good to hear from you. As you can see we have retired to the Mendocino Coast, about 150 miles north of San Francisco. This is a spectacularly beautiful part of California, though particularly wet this year, courtesy of El Nino. We've had over 80 inches of rain thus far this season and counting. But it is great for the Redwoods!

"I've been keeping busy since leaving UCLA in July. The 2nd Edition of *The Myocardium* was published last summer. Another project I've had in mind

News From Senior Physiologists

for a number of years, but had no time for, was to write a series for the 'serious reader' currently lav titled. 'Understanding Disease'. The idea is to present a series of clinical cases followed by presentation, in as non-technical language as possible, of the pertinent physiology, pathophysiology and treatment of the various diseases. The first volume, Understanding Disease, Vol. #1: Cause and Treatment of Problems in the Heart, Lungs, Blood and Blood Vessels is in the agent's hands and we'll see if we can get a publisher. If it were to be published and more than my friends and relatives bought it, I would tackle another system, e.g., gastrointestinal.

"Another, unrelated, project is a 'Scholars Program' for ethnically and/or economically disadvantaged kids which I started while at UCLA. We have a small pilot program with 15 kids in a middle school in Los Angeles. We

start support for educational enrichment (books, calculators/computers, concerts, museums, summer enrichment programs, etc.) And 1:1 mentoring in the 7th grade and continue the support through high school. The goal is to make these talented kids competitive for college entry. The concept is that education is the best means by which these children will become contributory members of our society in the 21st century. The cost is \$8600/student for the entire 6 years. So far, the program is working. I'm now trying to get some of the larger foundations to support expansion of the program in California and beyond.

"The most difficult project has been an attempt to resurrect my golf game after a 15 year hiatus. Problem, besides the long layoff, is that I'm 15 years older. Gives one additional insights into the physiology of aging." **Dudley Rochester writes:** "I retired as Head Division of Pulmonary and Critical Care Medicine in December 1993 and gave up clinical practice a few months later. However, I have continued a few areas of academic activity, mainly writing some reviews and chapters about respiratory muscles, respiratory muscle failure and pulmonary rehabilitation.

"In the last several years I helped initiate a research project to explore the relationships between dyspnea and the catecholamine response to exercise, in collaboration with Drs. Jing Liu and Ali Iranmanesh at the Salem, VA Veterans Administration Medical Center. It appears that dyspnea and exercise intensity both contribute to the plasma catecholamine response to exercise, but it seems unlikely that plasma catecholamines modulate the perception of exercise dyspnea."

Books Received

Advances in Modeling and Control of Ventilation. Richard L. Hughson, David A.

Richard L. Hughson, David A. Cunningham, and James Duffin (Editors).

Advances in Experimental Medicine and Biology, Vol. 450.

New York: Plenum, 1998, 241 pp., illus., index, \$105.00. ISBN: 0-306-46023-8.

BioQUEST Library, Vol. V. John R. Jungck (Editor). San Diego, CA: Academic, 1998, 148 pp., illus., index (License Agreement Req.). ISBN: 0-12099470-4.

The Insects: Structure and Function, Fourth Edition.

R.F. Chapman. New York: Cambridge University Press, 1998, 770 pp., illus., index, \$54.95. ISBN: 0-521-57890-6.

Integrative Aspects of Calcium Signalling. Alexej Verkhratsky and Emil G. Toescu (Editors). New York: Plenum, 1998, 408 pp., illus., index, \$125.00. ISBN: 0-306-046032-7. Investigating Biological Systems Using Modeling: Strategies and Software. Meryl E. Wastney, Blossom H. Patterson, Oxcar A. Linares, Peter C. Greif, and Raymond C. Boston. San Diego, CA: Academic, 1999, 381 pp., illus., index, \$69.95. ISBN: 0-12-736740-3.

Life in the Womb: The Origin of Health and Disease. Peter W. Nathanielsz. Ithaca, NY: Promethean, 1999, 363 pp., illus., index, \$27.50. ISBN: 0-916859-56-8.

The Neuroendocrine Regulation of Behavior Jay Schulkin. New York: Cambridge University Press, 1998, 323 pp., illus., index, \$37.95. ISBN: 0-521-45985-0.

Neuropeptides: Regulations of Physiological Processes. Fleur L. Strand. Cambridge, MA: MIT Press, 1999, 658 pp., illus., index, \$65.00. ISBN:0-262-19407. Nutrition and Reproduction.

William Hansel, George A. Bray, and Donna H. Ryan (Editors).

Pennington Center Nutrition Series, Vol. 8. Baton Rouge, LA: Louisiana State University Press, 1999, 443 pp., illus., index, \$95.00. ISBN: 0-8071-2306-4,

Perceptual Neuroscience: The Cerebral Cortex. Vernon B. Mountcastle. Cambridge, MA: Harvard University Press, 1998, 486 pp., illus., index, \$59.95. ISBN: 0-674-66188-5.

Principles of Integrative Environmental Physiology.G. Edgar Folk, Jr., Martin L. Riedesel, and Diana L. Thrift.

Bethesda, MD: Austin & Winfield, 1998, 500 pp., illus., index, \$60.00. ISBN: 1-57292-109-9.

Living Eyes to Seeing Machines

Mandyam V. Srinivasan and Svetha Venkatesh (Editors).

New York: Oxford University Press, 1997, 271 pp., illus., index, \$85.00. ISBN: 0-19-857785-0.

A recent joke has it that with the advent of the new robotics, the meaning of "AI" has shifted from Artificial Intelligence to Artificial Insects. Judging from the present volume, this is no longer funny, but quite serious. From Living Eyes to Seeing Machines demonstrates that research in mobile robotics, computer vision, insect flight control, and the neurophysiology of motion perception in various animals is undergoing a productive cross-pollination and contributing to our understanding of visual behavior, both natural and artificial.

Traditional artificial intelligence dealt with what were thought to be the highest forms of human intelligence, tasks such as playing chess or solving logical problems. Traditional robotics used the same techniques for navigation, building internal models of the world, and using general planning techniques to determine a path. However, while few insects play chess, anyone who has been harassed by a mosquito knows that insect flight control is quite remarkable. These "simple" minds have solved many of the problems of vision, locomotor control and navigation. Robotics researchers are thus now looking to these creatures for inspiration and insight.

However, the contributions go both ways, as Srinivasan and Venkatesh state in their introduction, "In studying natural vision one is constantly confronted with the problem of 'reverse engineering': that is, of understanding why an eye is built in a particular way, or why a particular neurone in the visual pathway responds the way it does." Thus, theory from computer vision and mobile robotics can help elucidate the functioning of insects and robot implementations can serve as test-beds for theories about them. This circular, interdisciplinary approach can result in mutual benefits to all parties involved.

With relatively few neurons, insects must economize information processing. The contributions from the insect researchers highlight many of the tricks that insects have evolved. Land and Collett discuss numerous examples of the techniques various invertebrates (including crabs, spiders, snails, bees, flies and shrimps) have developed to capitalize on regularities in their visual environments. Wehner recounts how ants and bees use approximate methods for dead-reckoning and orientation from sunlight polarization in the sky. These are "low-level solutions to high-level tasks." Honeybees also learn to recognize general shapes. Horridge reviews a series of careful experiments he has conducted recently in bees which elucidate their neural filters for color, orientation and symmetry. While their ability to discriminate orientations may seem limited to us, their capacity to discriminate patterns based on overall symmetry is quite remarkable. Horridge speculates that these symmetric patterns resemble "frozen" optic flow fields.

Optic flow is the pattern of motion that is produced as one moves through the world. The optical motion of closer objects is faster than that of farther ones. The motion edges of objects off one's path accelerate, while the point towards which one is moving has no motion at all. Any agent that can detect this information can use it to control its actions. Thus, a number of chapters discuss ways in which animals and robots exploit the information in optic flow.

Lehrer describes how bees will change their normal flight patterns so as to pick up better motion information for the location of edges. In addition, bees perform a "turn-back-and-look" maneuver upon leaving a goal location. They sweep back and forth in a stereotyped way, thereby simplifying the detection of the objects near the goal in order to recognize them upon return. A robot could easily be made to perform this same maneuver.

Frost and Sun discuss some experiments on another flying creature, the pigeon, in which the neural motion pathways have been well studied. Neurons appear to exist that use visual motion information to extract figures from the background, and others that signal the time to contact of an approaching object for avoidance. Based on similar neurons found in the optic lobe of locusts, Rind describes an artificial neural network model that can signal a collision course. However, not only must an animal (or robot) know what is coming towards it, it must know where it is going. Fermüller and Aloimonos describe a simple algorithm for determining one's heading from qualitative optic flow, a method they have implemented in a robot and one that should be investigated in insects. Another mathematical analysis of optic flow is given by Dahmen, Wüst, and Zeil. They propose a set of "matched filters" that can determine one's "ego-motion" (instantaneous translation and rotation) with a simple analysis of optic flow. Under typical noise and motion conditions, they show that this is as good as a full analysis. These results help explain why neurons in the lobula plate of the fly have receptive fields in both eyes, 180 degrees apart. Cliff, Harvey, and Husbands discuss their work for evolving (with genetic algorithms) simple visual control networks. In their future work, information about an animal's behavior will be used to design the fitness function for the genetic algorithm. The neural controllers that evolve might then be used to understand real neurons in the original animal.

Weber, Venkatesh, and Srinivasan perform what might be called a robo-ethological study in a small robot that implements a particular theory of obstacle avoidance based on experiments on bees performed by Srinivasan and colleagues. While similar implementations have been done by a number of groups around the world, including myself, this is the first by an insect researcher. Such illustrative examples fulfill one aim of this book: to inspire researchers to use the tools from different fields in order to understand how a creature (be it natural or artificial) can, for example, navigate using vision.

For those familiar with one of these fields, the book offers a host of pertinent insights about the others. For those unfamiliar and curious, the book provides a useful introduction by some of the most influential authors in each of their respective fields. While the chapters range from broad reviews to detailed original work, each chapter makes a connection from its particular field to the others, whether it is from computer vision methods of navigation which may be discovered in insects, or from insect behavior which could be (or has been) implemented in a robot. The editors should be commended for bringing together such a fine collection of interdisciplinary work. Hopefully, this book will inspire yet more.

> Andrew P. Duchon Brown University

Video Microscopy: The Fundamentals, 2nd Edition

Shinya Inoue and Kenneth R. Spring New York: Plenum, 1997, 741pp, illus., index, \$95.00 ISBN: 0-306-45531-5

The field of video microscopy has made major advances over the past decade. In particular, turnkey digital video imaging systems are now commercially available at reasonable prices. This was not the case when the first edition of Video Microscopy was published some 12 years ago when microscope digital video imaging systems were assembled by experimental scientists from individual parts. They also, more likely than not, wrote the acquisition and analysis software. Improvements in imaging system hardware over the past decade include transition from SIT to ICCD video cameras and cooled slow scan CCD cameras, the availability of more powerful and faster personal computers, more versatile frame grabbers, as well as cheaper bulk data storage medium. This is paralleled by development of more user-friendly software, particularly in the Windows environment. Thus today, a scientist with little background in microscopy or digital video imaging can "import" this important technique to the laboratory, provided the up-front financial burden is met. Inoue and Spring therefore provide a timely and valuable service by updating and, in some instances, totally revamping the classic textbook on video microscopy. Video Microscopy: The Fundamentals, second Edition, should be a reference in every laboratory involved in microscope digital video imaging techniques.

There are many new additions in the second edition. For example, Chapter 2 (Chapter 5 in 1st ed.) on microscope image formation has been expanded to include 3dimensional diffraction pattern, pointspread function, etc. These concepts are important to readers interested in subcellular structures or ionic domains in living cells. The section on generation of image contrast has also been updated to include fluorescence imaging, luminescence, and differential interference contrast. Recent developments such as green fluorescent protein and ratiometric imaging are also highlighted. An additional bonus is that practical aspects of microscopy such as adjusting illumination, choosing objective lenses, and care of optical elements are now conveniently grouped into a stand-alone chapter (Chapter 3).

Most of the excellent discussions and illustrations on video signal fundamentals (Chapter 5; Chapter 6 in 1st ed.) have been retained with updates on high definition TV (HDTV). The new table on the World's major color broadcasting systems is much appreciated. Another major welcoming addition is the detailed discussion of available solid-state cameras, and low-light- level cameras including image intensifiers. In the first edition, the discussion of video imaging devices focused on vidicon tubes. By contrast, there is now an entire chapter (Chapter 7) dedicated to solid-state cameras, the previous discussion on vidicon cameras was wisely retained in a separate section in Chapter 6 titled "Characterizing Video Sensors." Basic video concepts such as shading, dark current, dynamic range, gamma, geometric distortion, bloom and lag are clearly explained and give the novice a solid understanding of the meaning of the terms to avoid the usual imaging pitfalls.

As one reads on, one continues to be rewarded by exceptionally clear writings. For example, the explanation on the mechanics of register shifts in CCD sensors (p. 281) is particularly good. The section on cooled, slow-scan CCD camera (p. 305-p. 320) is timely, with its application to confocal imaging. The discussion on matching pixel size of CCD sensor with diffractionlimited resolution of an objective lens (p. 312) is particularly illuminating.

Chapter 9 in first edition on analog video processing and analysis has been deleted in

favor of a more in-depth discussion of digital image processing (Chapter 12, 2nd ed.) which is much more commonly used. Introduction of basic digital processing concepts, such as aliasing, jitter, least significant bit, sampling frequency, etc., is clear without the use of complicated jargon. For the more advanced reader, the classic book *Digital Image Processing* by K.R. Castleman is referred to and recommended.

Some errors in the 1st ed. have been corrected. For example, improvement in signalto-noise ratio by averaging N frames is given by N (p. 529, 2nd ed.), and not 2N-1 as given on p. 335 in the first edition.

There are some minor suggestions. I like the "old" description of how the vidicon tube works (p. 191-193, 1st ed.) better than the revised version (p. 238-244) in the second edition. While VCR and video tape recording received an in-depth discussion (perhaps too much detail), digital video recording had only a cursory overview. For the biologists in the readership, perhaps a brief introduction to p-type and n-type semiconductor, a pn junction and semiconductor diode will make it easier to understand solid-state devices (p. 273). This is particularly helpful in the discussion of structure of simple CCD (p. 284) in which the term "doped polysilicon" appeared without any prior introduction.

In summary, *Video Microscopy: The Fundamentals, 2nd Edition*, is destined to become a classic reference. Chapters 5 to 8 are "must reads" for anyone interested in video imaging. They are very well written and easily understood by biologists. Inoue and Spring have succeeded in explaining difficult optics and imaging concepts to the "masses" in simple and readily understandable terms. This book should rightfully take its place in every reference library in universities and medical schools. It will prove extremely valuable to novices and seasoned scientist involved in digital video imaging of living cells.

> Joseph Y. Cheung Pennsylvania State University

Muscle Damage

Stanley Salmons (Editor) New York: Oxford University Press, 1997, 243 pp., illus., index, \$65.00. ISBN: 0-19-262753-8.

This book provides a useful review of current knowledge about the process and mechanisms of skeletal muscle injury. As stated in the preface, the book is an updated, edited version of a set of invited papers published in a special issue of the journal, *Basic and Applied Myology* (4: 2-112, 1994). As such, the style and level of presentation of the book are appropriate for graduate students and investigators working in the field of skeletal muscle.

Although the text covers various etiologies of muscle pathology, the primary emphasis is on damage resulting from muscular contractions; 6 of the 11 chapters deal with contraction-induced injury, and are written by investigators who have published extensively on this topic. Taken together, these chapters provide an reasonable coverage of the muscle injury caused by eccentric contractions (in which muscles are lengthened while active). The opening chapter by Bär et al. provides a brief overview of the progression of contraction-induced injury, the various methods used to quantify the damage, and what is known about prevention and treatment of the pathology (158 references). His discussion of the validity of the different methods used in the study of muscle damage is particularly useful. The following chapters primarily describe studies on contraction-induced muscle damage from the authors' respective laboratories utilizing both human subjects and animal models. Faulkner and Brooks present findings from their research with an in situ mouse extensor digitorum longus muscle model.

They argue that the best criterion for quantifying contraction-induced injury is the resulting force deficit, and present their evidence for initial and secondary phases of force loss following eccentric contraction protocols. They make no reference to other human and animal studies that do not show the secondary phase. Fridén and Lieber describe the rabbit tibialis anterior muscle model they have employed to study the time course of morphological and mechanical changes following eccentric contractioninduced injury, and propose a model for the etiology and progression of the injury based on their and other's work. Jones and Round compare the manifestations of eccentric contraction-induced muscle injury with those observed after reperfusion injury, with particular emphasis on the similarities in release of intramuscular proteins into the circulation under the two conditions. Lexell et al. present data from their studies on histopathological changes in rabbit tibialis anterior and extensor digitorum longus muscles following different patterns of chronic low frequency stimulation of the muscles.

The remaining chapters do not refer specifically to contraction-induced injury, but cover other aspects of muscle damage. McArdle and Jackson describe general cellular mechanisms that may play critical roles in skeletal muscle damage, with particular emphasis on calcium, free radicals, insufficient energy supplies, and the interactions among these factors. Rizzi et al. describe the biochemical and molecular markers they have employed to quantify degeneration and regeneration of muscle fibers in biopsies from clinical and experimental studies. Cox et al. discuss the use of ⁹⁹technetium pyrophosphate uptake by muscles as a measure of muscle damage in rabbit muscle injured by chronic low frequency electrical stimulation. Helliwell's chapter provides an in-depth review of the immunohistochemical changes in muscles from patients with various myopathies (325 references), and serves as a valuable reference source on this topic. The final chapter by Salmons covers the damage in skeletal muscles resulting from their employment as functional grafts, with the principle focus on the latissimus dorsi muscle in cardiac assistance.

With the exception of several of the chapters as noted above, the contributions do not represent comprehensive reviews of the topics covered, but primarily present findings and perspectives of the respective authors. It is therefore not surprising that some newer concepts and directions in this field of study are not discussed. As one example, there is no reference to the role that excitation-contraction uncoupling has been shown to play in some models in the dramatic force loss in muscles injured by eccentric contractions. Nonetheless, the book as a whole provides a reasonably comprehensive coverage of current views and concepts in the field. Although the editor states in the preface that he attempted to standardize nomenclature across the various chapters, there are examples of different terms used to describe the same phenomenon; e.g., most authors refer to force production in muscles during lengthening as "eccentric" contractions, whereas in another chapter these are referred to as "pliometric" contractions. However, these are relatively minor problems for the advanced reader for whom the book is designed, and overall the book provides a useful overview of experimental and clinical muscle damage. 💠

> R.B. Armstrong Texas A & M University

John F. Perkins Memorial Award

The John F. Perkins, Jr. Memorial Award promotes cultural and scientific benefits associated with the international aspects of physiology. The award provides supplementary aid to families of foreign scientists working in the US. In this way, young scientists are able to bring their families and, thus, make full use of the cultural, as well as the scientific, benefits associated with an international exchange. The program presupposes that the visiting scientist and his/her host already have made arrangements for scientific collaboration and have sufficient funds to cover the needs of the visiting scientist.

Two to four awards are made each year. Applications for the Perkins Award must be made jointly by the host, who must be an APS member, and the visitor. The recipient receives funds generally not exceeding \$3,000. The size of the award depends on the estimated needs over and above the amount already available to the visiting scientist.

The deadline for applications is May 15 and November 15.

Cellular and Molecular Biology of Airway Chemoreceptors

Chemoreceptor

Ernest Cutz. New York: Chapman & Hall, 1997, 224 pp., illus., index, ISBN; 0-412-10801-1

The above referenced book represents a state of the art review on cellular and molecular aspects of pulmonary neuroendocrine cells (PNEC) and pulmonary neuroepithelial bodies (NEB). Altered distribution and/or number of PNEC/NEB is associated with a host of neonatal and adult conditions characterized by impaired pulmonary ventilation. The number of PNEC/NEB is also increased in the lungs of patients with lung cancer. Moreover, lung tumors with neuroendocrine differentiation (small cell carcinoma and carcinoid) share many functional features with PNEC. Studies into the molecular regulation and function of PNEC/NEB are thus highly relevant to a wide spectrum of neoplastic and non-neoplastic pulmonary diseases.

While the book succinctly summarizes anatomical/morphological characteristics of PNEC/NEB and historical arguments for the chemoreceptor function of NEB, major emphasis is given to studies into the oxygensensing mechanisms of NEB. These studies have only recently become possible thanks to the establishment of several in vitro systems for PNEC/NEB which are also described in detail. In analogy to findings derived from CB glomus cells, a prototype sensor, Dr. Cutze's group has pioneered the electrophysiological characterization of NEB cells. Using an in vitro system of NEB, these elegant studies culminated in a model of airway chemoreception involving the closure of channels, resulting in Ca^{2+} influx and neurotransmitter release. The methodology for the electrophysiological studies is in depth presented, a fact much to be appreciated by those readers less adept with these techniques.

A brief review of studies on NEB under experimental and disease conditions includes the effects of acute and chronic hypoxia as well as the effects of tobaccoassociated chemical stimuli (nicotine, nitrosamines) and asbestos on the number and immunocytochemical properties of PNE/NEB and neurotransmitter release in various animal models. This section of the book is rather descriptive, emphasizing the need for mechanistic investigations on the chronic effects of such stimuli on the regulation and responsiveness of PNEC/NEB. While the increase in PNEC/NEB observed with neonatal and adult pulmonary diseases is likely the result of impaired pulmonary ventilation, evidence for a potential etiologic role of impaired chemoreceptor function of these cells in congenital central hypoventilation syndrome and sudden infant death syndrome is presented.

The book provides the reader with the background information and methodological detail to successfully initiate experiments into the cellular and molecular regulation and function of PNEC/NEB in in vitro experiments. It is to be hoped that that this information will stimulate more research into the physiological and pathological role of these cell systems.

> Hildegard M. Schuller University of Tennessee

Chemistry and Biology of Serpins

Frank C. Church, Dennis D. Cunningham, David Ginsburg, Maureane Hoffmann, and Douglas M. Tollefsen (editors)

Advances in Experimental Medicine and Biology, Vol. 425

New York: Plenum, 1997, 358pp, illus., index, \$95.00

ISBN: 0-306-45698-2

This volume consists of a series of chapters and abstracts from the First International Symposium on the Chemistry and Biology of Serpins held at the University of North Carolina, Chapel Hill in April 1996. The extremely rapid expansion in the size of the serpin family of proteins and in the breadth of their biological functions might give pause in deciding to organize a meeting and a volume about a single generic molecule. On the other hand, the growth in our understanding of the structural and functional properties of the serpins at the molecular level may serve to accelerate progress in the study of their more enigmatic biological processes, new ones of which are appearing with great frequency. The expanding catalogue of serpins will surely require a reexamination of their properties and structures as new functions are discovered.

The editors have provided a judicious mixture of general chapters discussing the mechanism and structures of the serpins with more specialized chapters on single serpins. Chapters are organized into seven sections: Introduction, Coagulation, Neurobiology and Cancer, Development and Reproduction, Inflammation and Non-Inhibitor Serpins, and the abstracts are similarly categorized. Chapter 2 of the Introduction provides a good overview of what is known about the mechanistic and structural aspects of serpins, including backbone figures of structures. A few more labels in these figures would have helped orient the nonstructural reader.

The Coagulation section has chapters dealing with the well-studied antithrombin, including its interactions with heparin, and two chapters on the less-studied protein inhibitor C and heparin cofactor II, providing a good balance in this area. These chapters are well supplemented by abstracts of interesting talks throwing new light on the structural and mechanistic basis for heparin activation of serpins. Section 3 on Neurobiology and Cancer has a single chapter on thrombin and its receptor and their mitogenic effects on neurons and astrocytes. Thrombin in turn is controlled by the serpin, proteinase nexin-I, which may be important in development and brain injury. The other two chapters in this section deal with maspin, a tumor suppressor serpin and with proteinases in metastasis, with more emphasis in the latter on the proteinases than on the serpins. Maspin offers an intriguing case of a serpin with a biological activity (tumour suppression), whose function is unlikely that of an inhibitor of known proteinases, despite its susceptibility to cleavage in its reactive site loop. It is an example of the growing subset of the serpins, represented elsewhere in this volume, which share a closely similar structure to the proteinase inhibitor serpins, but which lack proteinase inhibitor activity. Unravelling the function of these serpins is likely to be an interesting new chapter in this already interesting family of molecules.

The four chapters on fibrinolysis all deal with plasminogen activation and its inhibi-

tion by plasminogen activator inhibitors (PAI), a topic of intense clinical and pharmaceutical interest. The chapter by Lawrence et al. addresses the structural basis for the serpin inhibitory mechanism through studies on PAI1. The question of the nature of the conformational changes in inhibitor serpins which lead to the formation of their highly stable complexes with target proteinase was vigorously discussed at this meeting and is well elaborated with new experimental data in this chapter. A chapter on tissue plasminogen activator specificity is a classical and exhaustive study of the specificity determinants of this important proteinase. Another on the role of plasminogen activators and their PAIs in fibrinolysis reaches farther into in vivo and cellular experimental systems. A chapter on PAI2, a serpin which occurs in both cytosolic and secreted forms, and also spontaneously polymerizes, provides a compressed overview of this understudied serpin.

The section on Development and Reproduction includes a chapter on progesterone-induced serpins, another likely noninhibitor serpin with muliple biological effects and another chapter on the alternative splicing in the tobacco hornworm serpin, which produces serpins of different specificity. Finally, a chapter on serpins of the male genital tract provides a useful catalogue of these serpins as well as a discussion of their role in clinical measurements of PSA (prostate specific antigen).

The longest section deals with a number

of diverse serpin manifestations in inflammation. Discussions of serpins which block caspases in apoptosis, act as virulence factors by attenuating host inflammatory response, serve as apparent chaperones in the maturation of procollagen to collagen, and induce differentiation of retinoblastoma cell lines illustrate the fundamental importance and robust versatility and adaptibility of these molecules. The important role of mutants in the pathophysiology and also the investigation of structure-function relationships of serpins is laid out for C1 inhibitor and for a number of serpins, the latter providing a good overview of serpin structure and function as well. A scan of the abstracts further rewards the reader with a view of the breadth of involvement of this class of proteins in biological processes.

Those who have become addicted to slick multicolor figures will be disappointed in this volume, which has only black and white figures, but there is no loss of information. The editing is thorough with only rare typographical errors. The audience for this volume might come from several constituencies. There are good general overviews of serpin properties, mechanisms and structure as well as highly focused chapters and abstracts on specific serpins. The former will inform the reader who is new to the field and needs a clear introduction, while the latter will appeal to specialists. The serpins demand some understanding at the molecular structural level of even the most biological investigators in order to comprehend their roles in vivo. Sufficient information is presented in this volume to achieve that level of structural and mechanistic knowledge. I suspect that one important audience for this volume will be investigators who have isolated and sequenced a new gene, which turns out to belong to the serpin family. Knowing nothing about serpins, an excursion into this volume will provide them with both a general introduction to this interesting family of molecules as well as a broad sampling of the varied specific serpins and their still unfolding roles. Given the rapid expansion of the serpin family and the intense work being carried on to understand some of their still mysterious functions, this volume is unlikely to have a long half life of currency. Chapters of a more general nature will probably retain their value as references longer than the more specific ones, which nevertheless provide valuable entry points for new investigators who must understand the serpins in order to interpret experiments and understand the biology and physiology in which the serpins play so many important parts.

> H.T. Wright Virginia Biotech Research Park

Announcements

Lake Cumberland Biological Transport Group Meeting

It is time to plan for the 1999 Lake Cumberland Biological Transport Meeting (affiliated with APS). The central theme of the meeting is biological transport, but presentations in other areas are welcome. This is an excellent forum for principal investigators, postdoctoral fellows, and graduate students alike to present their data and receive feedback.

The scientific sessions will be held in the mornings and evenings on **Sunday, June 20 to Tuesday, June 22**. Afternoons are free to enjoy swimming, fishing, golfing, riding, hiking, or any of the other activities available at the site of the meeting, Lake Cumberland State Resort Park, Jamestown, KY.

For more informat	tion, contact:
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Scientific Meetings and Congresses

1999

February 13-17

Biophysical Society 43rd Annual Meeting, Baltimore, MD.

Information: Biophysical Society, 9650 Rockville Pike, Ste. 0512, Bethesda, MD 20814-3998. Tel: 301-530-7114; fax: 301-530-7133; email: society@biophysics.faseb.org; Internet: http://www.bio-physics.org/biophys.

February 20-26

Medical Imaging 1999, San Diego, CA.

Information: International Society for Optical Engineering (SPIE), PO Box 10, Bellingham, WA 98227-0010. Tel: 360-676-3290; fax: 360-647-1445; e-mail: mi99call@spie.org; Internet: http://www.spie.org/info/mi/.

February 21-26

Salivary Glands and Saliva Gordon Conference, Ventura, CA.

Information: Dr. Bruce J. Baum, organizer, MSC 1190, NIDR, NIH, Bldg. 10, Rm. 1N113, 9000 Rockville Pike, Bethesda, MD 20892-1190. Tel: 301-496-1363; fax: 301-402-1228; email: bruce_j_baum@nih.gov; Internet: http://www.grc.uri.edu or see the upcoming issue of *Science* on Gordon Conferences.

February 27-March 3

International Hypoxia Symposium, Jasper Park Lodge, Alberta, Canada.

Information: Rose Galano, International Hypoxia Symposium, Continuing Education and Conference Services, Faculty Health Sciences, Rm 1M7, 1200 Main Street West, Hamilton, Ontario, Canada L8N 3Z5. Tel: 905-525-9140, X22671; fax: 905-572-7099; email: info@hypoxia.net; Internet: http://www.hypoxia.net.

March 25-26

25th Annual Diagnosis and Treatment of Neoplastic Disorders, Baltimore, MD.

Information: Conference Coordinator, Johns Hopkins Medical Institutions, Office of Continuing Medical Education, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205. Tel: 410-955-2959; fax: 410-955-0807; email: cmenet@jhmi.edu; Internet: http://www.med.jhu.edu/cme.

April 5-8

Physiology Teaching in the Developing World: Models for Quality Learning, Karachi, Pakistan.

Information: Dr. Arif Siddiqui, Conference Secretariat, International Workshop on Physiology

Teaching, The Aga Khan University, Stadium Road, Karachi-74800, Pakistan. Tel: +92-21-493 0051, ext. 4567; fax: +92-21-493 2095 or 493 4294; e-mail: arif.siddiqui@aku.edu.

April 15-16

Biomarkers and Surrogate Endpoints: Advancing Clinical Research and Applications, Bethesda, MD.

Information: Tel: 301-468-6004; Internet: http://www4.od.nih.gov/biomarkers.

May 1-4

Pediatric Academic Societies' Annual Meeting (sponsored by American Pediatric Society, Society for Pediatric Research and Ambulatory Pediatric Association), San Francisco, CA.

Information: Debbie Anagnostelis, APS-SPR Central Office, 3400 Research Forest Drive, Suite B-7, The Woodlands, TX 77381. Tel: 281-419-0052; fax: 281-419-0082; email: info@aps-spr.org.

May 16-20

New World Science for the Next Millennium(sponsored by American Society for Biochemistry and Molecular Biology, Pan-American Society for Biochemistry, Canadian Society of Biochemistry and Molecular and Cellular Biology, and Division of Biological Chemistry of the American Chemical Society), Lake Tahoe, California.

Information: ASMBS Fall Symposium Office, 9650 Rockville Pike, Bethesda, MD 20814-3998. Tel: 301-530-7010; fax: 301-530-7014; e-mail: gswindle@osmc.faseb.org; Internet: http://www.faseb.org/meetings/asbmb/jointmt.htm.

May 21-22

Workshop on Surgery for Movement Disorders, Toronto, Ontario, Canada.

Information: Karma Farah, Continuing Education, Faculty of Medicine, University of Toronto, 150 College Street, Room 121, Toronto, Ontario, Canada M5S 3E2. Tel: 416-978-2719; fax: 416-971-2200.

May 21-23

7th International Congress on Physical Education and Sport, Komotini, Greece.

Information: Savvas Tokmakidis, PhD, 7th International Congress on Physical Education and Sport, Department of Physical Education and Sport Science, Democritus University of Thrace, Komotini, 69100, Greece. Tel: +30-531-21764 or 21762; fax: +30-531-26908; email: stokmaki@kom.forthnet.gr; Internet: http://platon.ee.duth.gr/ ~tefaa/icpes99.

May 22-27

13th Annual Human Anatomy and Physiology Society Conference, Baltimore, MD.

Information: HAPS/OSG, 222 S. Meramec, Suite 303, St. Louis, MO 63105.

June 7-10

Critical Issues in Tumor Microcirculation, Angiogenesis and Metastasis: Biological Significance and Clinical Relevance (13th Annual Offering), Boston, MA.

Information: Carol Lyons, Administrator, Radiation Oncology, Massachusetts General Hospital, Boston, MA 02114. Tel: 617-726-4083; fax: 617-726-4172.

June 13-18

Society for Developmental Biology 58th Annual Meeting, Charlottesville, VA.

Information: Society for Developmental Biology, 9650 Rockville Pike, Bethesda, MD 20814. Fax: 301-571-5704; email: sdb@faseb.org; Internet: http://sdb.bio.purdue.edu.

July 10-15

Neural Mechanisms in Cardiovascular Regulation (FASEB Summer Research Conference), Saxtons River, VT.

Information: Adele Hewitt, FASEB Office of Scientific Meetings and Congresses, 9650 Rockville Pike, Bethesda, MD 20814-3998. Tel: 301-530-7010; fax: 301-530-7014; e-mail: ahewitt@faseb.org; Internet: http://hsc.virginia.edu/~pgg.