



The Physiologist

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Dale Benos

79th President of APS



Dale Benos

I am truly honored to be the 79th president of the American Physiological Society (APS). I cannot but be awed by examining the list of previous occupants of this office. Moreover, I have had the very good fortune of interacting with many of these esteemed individuals (more of them than I care to admit). In fact, I trained with two former Presidents, Bodil Schmidt-Nielsen and Daniel Tosteson. It was from these two individuals that I first learned to love physiology and the APS.

They instilled in me the appreciation of the wonder of science—and its attendant responsibilities. To them, I am forever grateful. I must say that in my 24 years as a member of the APS, this confidence and enthusiasm for science, particularly physiology, have been continually reinforced and renewed by my fellow APS colleagues. This is precisely why I am really excited about the future: the future of physiology, the future of science, and the future of the APS.

The APS is a great Society. From its

small beginnings in 1887 (there were only 27 founding members), the Society has grown to over 10,500 members today. The primary mission of the APS is to enhance the ability of all life scientists (not only physiologists) to improve the health and well being of society. This is accomplished through its research and educational programs. The Society is diverse with respect to the different disciplines represented by its members, and this diversity is good

because it provides a fertile environment for productive collaboration and interchange. Throughout its history, the APS has been at the forefront of scientific publication, education, the ethics of human and animal experimentation, and public policy. The APS is blessed with a truly exceptional band of senior managers and an outstanding executive director. The 70+ member staff is equally committed to making the organization run smoothly and effectively. The APS is also diverse in its membership,

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diverse with respect to discipline, gender, culture, and geography. After all, it is the members who constitute and define the Society. But there is much more to do. The Membership Committee does an outstanding job of advertising

and canvassing scientific communities for new members, but member attrition, especially among students, is unacceptably high. As President, I call upon you to serve the Society by helping reverse this trend. Moreover, I call upon you to serve the Society in other ways that I

will outline below. I would like to make member activism the defining phrase of my year as APS President.

Science in general and physiology in particular are at a crossroads. Never before in history have scientists possessed the tools to address so many

Introducing Dale Benos

Dale J. Benos is Endowed Professor of Physiology and Biophysics and Chairman of the Department of Physiology and Biophysics at the University of Alabama at Birmingham in Birmingham, AL. He received a BA degree in Biology from Case Western Reserve University and his PhD in Physiology and Pharmacology at Duke. He was an Andrew W. Mellon Scholar in the Laboratory of Human Reproduction and Reproductive Biology at Harvard Medical School, where he was both Assistant and Associate Professor in the Department of Physiology and Biophysics. After moving to the University of Alabama at Birmingham in 1985, he was appointed Senior Research Scientist in the Gregory Fleming James Cystic Fibrosis Research Center, Senior Scientist in the Nephrology Research and Training Center, and then in 1987 was appointed full Professor in the Department of Physiology and Biophysics. Benos became Chair of the department in 1996. He has subsequently obtained Senior Scientist positions in the UAB Center for AIDS Research, the Comprehensive Cancer Center, the Arthritis and Musculoskeletal Center, and the Center for Computational and Structural Biology. Benos also holds secondary faculty status in the Departments of Cell Biology and Neurobiology. In 2005 he was named UAB's first holder of the Endowed Professorship in Physiology.

Benos' research interests include mechanisms of cation transport across epithelial and cellular membranes; developmental aspects of ionic transport and metabolic function in preimplantation mammalian embryos and cultured neural and epithelial cell lines; isolation, reconstitution, and molecular biology of Na⁺ and Cl⁻ channels from epithelial membranes, including kidney, lung, and trachea; pathogenesis of AIDS Dementia Complex; ion channels and brain tumors. He has authored over 200

original articles and 80 invited reviews, as well as edited four books. He has been the Principal Investigator for 19 individual research grants, and he has a patent pending for research efforts involving inhibition of inward sodium currents in human cancer.

In addition to his research efforts, Benos has been a visiting professor, distinguished lecturer, or invited speaker at more than 100 major national and international universities or symposia, chairing seven Experimental Biology symposia. Benos has been a member of eight NIH special study sections, an *ad hoc* reviewer for seven NIH/CF study sections, and chaired multiple site visits and special emphasis panels. He has been a member of or chaired over 50 major committees at Harvard and UAB, including Curriculum Design and Faculty Development at Harvard, Harvard's Committee on Postdoctoral Fellows, Dental Curriculum Re-Design at UAB, UAB Medical Center Strategic Planning, UAB Medical Education Committee (serving in several capacities including Chair), Minority Medical Education Program, Alabama State Education Task Force, UAB Research Foundation Funding Flow Task Force, chairing several scientific misconduct inquiry and investigation committees, as well as serving on or chairing several chair search committees. Benos presently serves on two editorial boards (*American Journal of Physiology: Cell Physiology* and *SHOCK*); just completed six years as a section editor for *Biochemica et Biophysica Acta (Biomembranes)*; a series editor for *Current Topics in Membranes*; and an associate editor for *Journal of Biological Chemistry*. He is currently editor of APS's "Physiology in Medicine" series that is published in *Annals of Internal Medicine*. He is a past associate editor, as well as editor-in-chief, for *American Journal of Physiology: Cell Physiology*. He has served as editorial board member for *Journal of American Society of*

Nephrology, *Placenta*, *Biological Research*, *Current Cardiology Reviews*, and for almost 20 years on the board of the *Journal of Biological Chemistry*. He was also associate editor for *Comments on Molecular and Cellular Biophysics*. He has mentored 14 undergraduate students, eight graduate students, 34 postdoctoral fellows, and numerous summer students in his laboratory. Benos has lectured in 29 different graduate courses at Duke University Medical School, Harvard Medical School, and the University of Alabama School of Medicine. He was also a guest lecturer in medical physiology at the Medical University of South Carolina, SUNY at Stony Brook, Tulane, and University of Arkansas. Benos has been a two-time nominee for an Excellence in Teaching award from Harvard and was a nominee for the Argus Award for Best Small Group Leader in the Medical Physiology course at UAB.

Benos became a member of the APS in 1982. He has held many positions in the Society, e.g., Councillor, Chair of the Awards Committee, Chair of the Joint Managing Board (IUPS and APS), and Chair of the Publications Committee. Because of his experience as Chair of the APS Publications Committee, he has developed several courses at UAB addressing ethics in publications. In particular, his seminar series for the Short Term Training Program at UAB is mandatory for all medical and dental students who participate in summer research programs. In addition to his APS service, Benos has been active in other professional societies, including, Council of Science Editors, Society of General Physiologists, The American Society for Biochemistry & Molecular Biology, The American Society of Nephrology, Association of Chairs of Departments of Physiology, Society of Neuroscience, New York Academy of Sciences, the Biophysical Society, and the American Society of Cell Biology. ❖

sophisticated and important questions. But with this sophistication come incredible costs, both in terms of time and money. Moreover, our academic institutions have leveraged federal funds to such an extent that the financial structure of many universities is tenuous at best. Scores of junior scientists are at risk of losing their jobs because of uncertainties in extramural funding. This problem exists in spite of the fact that in 2003 the NIH realized a five-year plan doubling of its budget to nearly \$29 billion. The situation is even bleaker for physiologists. After the completion of the doubling period, the percentage "market share" of extramural funds secured by scientists in physiology departments actually decreased (see the article entitled "NIH Funding Trends in Physiology" in this issue of *The Physiologist*).

Science is clearly under pressure. The outlook for federal funding is grim. On top of the increasing cost of doing sophisticated research, we are affected by broad economic factors such as rising fuel costs. The Federal deficit is growing, and both Congress and the Administration have signaled an unwillingness to provide NIH with further increases. The current furor over research with human embryonic stem cells and teaching Intelligent Design as an alternative to evolution can be seen at least in part as indicators that many people lack basic scientific literacy and may even be antagonistic toward science - including some of our political leaders. It is paradoxical that scientists are viewed with suspicion and distrust on these issues even though according to Research!America and the 2004 National Science Board Science and Technology Indicators (<http://nsf.gov/nsb>), science as an occupation is rated highly in terms of respect and necessity.

What then is the reason for the controversy, and why in hard economic times should nonscientists want to see scarce tax dollars diverted to support what may be construed as a luxury? This is a fair question, and one that every physiologist should be prepared to answer, just as we should also be prepared to discuss controversies in science. It is incumbent upon us to explain to our non-science friends why we do what we do, why scientific research is necessary for the well-being of humanity, and especially to listen to their concerns. After all, our friends and neighbors are ultimately the ones who sup-

port our work. Consequently, I ask each of you to make a concerted effort to speak about what you do to your local community. Volunteer to speak to local civic organizations such as the Lions and Rotary Clubs, local school board, PTAs, or Chambers of Commerce about issues of science that directly impact their daily lives. To help in this regard, I have asked our Communications Committee to assemble a PowerPoint template on "What has Science Done for Me Lately" that our members can download and adapt for use in these venues. There are other PowerPoint templates available for download as well: "What is a Physiologist" and "Scientific Societies and the Scientist: What Do They Do for Each Other?" [<http://www.the-aps.org/education/undergrad/outreach.html>] Utilize these tools and make yourself available to your community.

The benefits of 10,500 APS members doing outreach of this sort could be enormous. First, you will help educate lay people about the necessity and importance of science in everyday life. This in turn will sensitize people to science issues at the local, state, and national levels. They may become more amenable to writing letters making their opinions known to their elected representatives at all levels of government. Second, your willingness to speak openly to people will help break down the 'ivory tower' concept that has plagued and isolated scientists throughout history. Third, you might shatter the old nerd stereotype and convince your friends and neighbors that scientists are people trying to make the world a better place. In his recent State of the Union Address, President Bush called for increased funding for the physical sciences and alternative energy sources, which is one of the administration's priorities for the FY 2007 budget. At the same time, there was a notable absence of any increase for biomedical research, with the NIH budget held flat. Many in government feel that with the doubling of the NIH budget completed, their obligation is fulfilled and biomedical scientists should be both grateful and satisfied. However, as we know very well, with funding rates trending downward, not only will our opportunities to understand human systems and disease be eroded, we are also jeopardizing our future ability to deliver outstanding health care. It is essential that we as scientists act to reverse this shortsighted notion of "adequate" funding support

for biomedical sciences. As physiologists and as life scientists, our Society should take a lead role in this effort, and there is no better place to start than at the local level. As Michael Crichton so eloquently put it, "Science is the most exciting and sustained enterprise of discovery in the history of our species...It's time to assume your power, and shoulder your responsibility to get your message to the waiting world. It's nobody's job but yours. And nobody can do it as well as you can." (*Science* 283:1461-1463, 1999).

In addition to the communications strategies outlined above, another area where APS members, particularly those associated with one of our twelve disciplinary sections, and especially our young investigators, can become active is in the arena of public policy and science advocacy. Needless to say, funding has become a major concern. As I pointed out above, advocacy in your local communities is essential because ultimately it is the community that elects officials who in turn vote on funding for science. Letter writing is also extremely effective. It is clear that members of Congress appreciate and react to letters written from scientists about funding, about science-related legislation, and other matters of concern. Science policy alerts emanate from both the APS and FASEB; please pay attention to these calls for letters because they do make a difference. Also, if you will be in Washington and want to visit your Representative and Senators, the APS public affairs staff will be happy to advise you on how to set up an appointment and what to expect. On a more personal note, decisions made in Congress and at the NIH directly affect our laboratory work. Consider all of the issues surrounding animal and human experimentation, effort reporting, and other compliance and regulatory requirements. These items consume an inordinate amount of time, time that can be better spent thinking about and doing science. I urge you to get involved to effect change. The APS will help coordinate such efforts and organize a more effective network for members to participate in such activities. Stay tuned!

To even get further down and dirty, all of us spend a huge amount of time writing grants, asking for money to do our work. The primary source of funds for many APS members is the NIH. According to a recent article by Emily Singer (<http://www.technologyreview>.

com/BioTech-Therapeutics/wtr_16208,259,pl.html), in the last three years (2004-2006) NIH funding has not even kept up with inflation. In fact, in fiscal year 2006, NIH appropriations were cut—the first reduction experienced since 1970. In the three years since the NIH budget doubling was concluded, the “purchasing power” of the NIH has actually decreased by 10%! Singer predicts that the biomedical science community should anticipate that only one in ten grant applications will be funded. Moreover, as you are all aware, there has been a massive reorganization of the study sections (or initial review groups). With the disappearance of study sections like the Physiology Study Section, the Cell Biology and Physiology Study Section, and the Lung Biology and Pathology Study Section and the appearance of study sections like Integrative Physiology of Obesity and Diabetes Study Section, Myocardial Ischemia and Metabolism Study Section, and Pathobiology of Kidney Disease Study Section, it is clear that emphasis is being placed on more disease-related, translational-type research. Are we as a Society positioned for these changes?

To explore further the funding situation for physiology researchers, I selected 37 out of the 181 regular study sections that are currently chartered by the NIH, and evaluated a) the percentage of regular members that are housed in departments in which ‘physiology’ appears in the name, and b) the percentage of regular study section members that belong to the APS. I was biased in my selection of the study sections, choosing to examine those most likely to review grants submitted by physiologists (e.g., cardiovascular, renal, endocrine, transport, exercise, gastrointestinal, pulmonary, and neural). Of the total number of listed regular members (657) in these 37 study sections, 11% belong to a physiology department, and only 18% are members of the APS. Obviously, our membership can participate more in these activities. This is an area in which each APS section can take a proactive role. The sections should identify study sections and institutes where their particular constituency receives their funding, and develop a strong relationship with the institute director, individual program directors, and scientific review administrators. In this way, strong ties can be established and a formal mechanism can be in place

within each section to suggest APS members to serve on these review groups. The Cardiovascular Section has such a system in place, and should be consulted by other sections to see how they have organized this process.

Several years ago, President John Hall initiated a Translational initiative within the Society in anticipation of these changes. Nearly 30% of our membership holds the MD degree. The APS needs to promote better interaction between its basic science members and their clinical colleagues. This can be accomplished through publications (there still is a Translational Research category for articles) and meetings. It is difficult to attract many clinical scientists, especially those living outside of the United States, to Experimental Biology because of the plethora of large specialty meetings (e.g., American Thoracic Society meeting, American Society of Nephrology meeting, The American Society of Gastroenterology meeting, and the Endocrine Society meeting, to name a few). The APS nonetheless has made efforts in this regard through our meetings and symposia, but more needs to be done. Joint sponsorship of symposia at these other meetings has started, but needs to be expanded. The APS has a conference program that can and should be used for such translational initiatives. This is an area where the membership can again make a difference, namely, by working with the Joint Programming Committee of the Society to develop new symposia and conferences to address this very important area.

One of the tremendous assets of the APS is its willingness, particularly in the last 20 years, to call ‘time out’ and ask itself, “What do we do well; what don’t we do well; what can we do better, and what should we be doing?” This self analysis has resulted in the establishment of three new journals (*Advances in Physiology Education*, *AJP-Lung Cellular and Molecular Physiology*, *Physiological Genomics*), a transformation of *NIPS* to *Physiology*, a greater reliance on the sections in the governance and meetings of the Society, more member benefits, an expansion of the APS educational programs, a revamping of its meetings, and a proactive stance in animal welfare, compliance, and ethical issues. The Society has always been at the forefront of publications, being one of the early adopters of online journal publication. It was also a founding

member of the DC Principles Coalition, a group of societal and university press publishers who have developed economically sustainable ways of providing access to electronic publications without shifting costs to scientists and, ultimately, to their funding agencies. APS has also taken a leadership role in developing an electronic publication archiving system, called LOCKSS (“Lots of Copies Keeps Stuff Safe”) and CLOCKSS (Controlled LockSS), respectively. APS members should be proud of their Society’s leadership role in these areas.

In 2004, the APS was awarded the prestigious Presidential Award for Excellence in Science and Engineering Mentoring for its groundbreaking efforts in minority science education. The education department has on-going active programs for summer training of undergraduate and high school students and high school teachers. This department in conjunction with Publications, through NIH funding, has developed a Professional Skills Workshop on writing and reviewing manuscripts. The first workshop was held in January 2006 in Orlando with an enrollment of 40 students. A second workshop will be held in Denver this May. Eventually, all of these materials will be transformed into a web-based course. In the future, these workshops will be expanded to include other topics such as Communication Skills for Oral and Poster Presentations and Career Planning and Management. The hope is that not only will the students learn from the workshop, but the instructors will go on to develop similar courses at their home institutions. Another recent project undertaken by the Animal Care and Use Committee in collaboration with the EEP section is the publication of a Resource Book for the Design of Animal Exercise Protocols. It should be noted that the synergy between all of the APS departments has been impressive, and is a model for how an effective society should operate.

In 2005 the APS held a strategic planning retreat. Planning began with a member needs survey that was made available via email to all regular members. Nearly 1,800 members participated, and the results are reported in this issue of *The Physiologist*. Survey respondents suggested a number of future directions the Society should take: strengthen public policy advocacy; enhance undergraduate physiology education programs; develop new programs to attract and retain young scientists;

integrate international scientists better into the APS; bridge industry with research and clinical practice; promote women and minorities in physiology; and continue to build top-notch journals. Sixty APS leaders met in Houston in late October 2005 to refine these ideas. Five major themes emerged: 1) APS will be the leader in the advancement of the life sciences that investigate biological function; 2) APS will be a compelling and vital home for young scientists and will provide a sustained commitment to them throughout all stages of their careers; 3) APS will drive the understanding of and appreciation for physiology and strengthen public and private support; 4) APS will be dynamic and relevant to an increasingly diverse and global membership; and 5) APS will be a mission-directed, adaptable, and fiscally sound organization. Council will meet again at the end of February to determine specific plans to accomplish these goals, including the creation of multiple task forces to take on the responsibility to ensure success. Some of you may be

called upon to serve on these task forces. One major effort during my presidential year will be to begin implementing action plans from this strategic planning initiative.

Every person should ask the question: why do I belong to the APS? Why does APS exist? The standard mantra is that the APS exists to promote the physiological sciences. What precisely does this mean? Surely the Society publishes journals, surely the Society organizes meetings, surely the Society educates teachers and students, and surely the Society advocates sound science policy. On one level, the APS exists to merge these activities in an organized and efficient fashion. But is that all? Is there anything deeper?

Why are you a member of the APS? Is it to associate with fellow scientists with like interests? Is it to access information concerning your own sub discipline? Is it to receive the complete on-line collection of APS journals, and discounts on other publications? Is it to receive free color when publishing your own work?

Is it to be eligible for member registration rates at Society meetings? Or is it to promote the discovery and dissemination of acquired knowledge to the scientific and lay communities? The first five questions view you, the individual scientist, as passive receivers of APS benefits. The last question views you, the individual scientist, as an active participant in the activities of the Society. I challenge each of you, especially the students, to redouble your commitment to the APS. In turn, you will be rewarded with more benefits. More importantly, you will realize great personal gain and satisfaction in making a real difference for the APS and the physiological sciences. I stand ready to lead and assist you in your efforts.

I would like to acknowledge several individuals for helpful discussions and for their comments on preliminary drafts of this article: Martin Frank, Catherine Fuller, Cathleen Guy, Rebecca Osthus, Alice Ra'anan, and Margaret Reich. ❖

APS Election Results

The American Physiological Society announces the results of the election of officers for 2006.

Hannah V. Carey, University of Wisconsin-Madison, is the new President-Elect.

The three newly elected Councillors taking

office on April 5, 2006 are **James W. Hicks**, University of California, Irvine; **Dee U. Silverthorn**, University of Texas, Austin; and **Michael J. Wyss**, Washington University, St. Louis, MO. The Councillors will serve for three years. ❖

President-Elect



Hannah V. Carey

Councillors



James W. Hicks



Dee U. Silverthorn



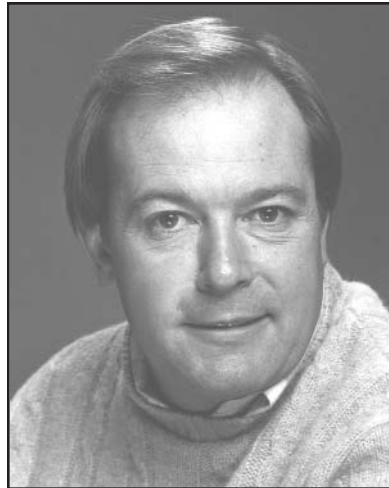
Michael J. Wyss

Introducing Ken Baldwin

Effective June 1, 2005, **Ken Baldwin** succeeded Sue Barman as the chair of the Section Advisory committee (SAC) of the APS. Prior to assuming this role Baldwin served on the Animal Welfare Committee from 1990-1993, was the APS representative to the FASEB Consensus Coalition on Federal Funding of Biomedical Research in which he chaired the Subcommittee on NASA from 1997-2000. This service was followed by his serving as chair of the Environmental and Exercise Physiology (EEP) section. He also served on the program committees for each of APS sponsored Biology of Exercise Specialty Conferences.

Baldwin is currently Professor of Physiology and Biophysics, School of Medicine at the University of California, Irvine (UCI) where he has been located for the past 33 years. He did his undergraduate work at Springfield College in Massachusetts where he received his Bachelor of Science degree, Magna Cum Laude, in 1964. Following completion of the Master of Science degree in Biomechanics and Physical Education at the University of Massachusetts, Baldwin served briefly as an Instructor of Physical Education at Keen State University in New Hampshire and at the University of Massachusetts, Amherst. He then began studies in Exercise Physiology at the University of Iowa, where he received his PhD in 1970 under the mentorship of Dr. CM Tipton. From 1970-73, Baldwin served as a postdoctoral fellow in the field of exercise biochemistry at Washington University School of Medicine in St. Louis under the direction of Dr. John O. Holloszy. Baldwin's pre-doctoral and post-doctoral research focused on the adaptive properties of different types of skeletal muscle in response to acute and chronic exercise stress.

After joining the faculty at UCI, Baldwin became interested in the effects of the microgravity environment on the structure and function of antigravity skeletal muscle. Although he initially received a grant from NASA in 1980 to study the effects of spaceflight on muscle mitochondrial function, it took him 11 years before completing this initial project, because of the lack of available flight opportunities during the initial stages of NASA's space lab program (hardly a good model in which to receive tenure in a research university). However, in the last decade he has had four flight opportunities in which to explore the effects of gravity on the



Ken Baldwin

mechanisms of *a*) atrophy processes in adult animals and *b*) muscle growth and differentiation processes in neonatal models. These studies laid the ground work for our current understanding that sarcomeric gene expression in antigravity skeletal muscle is highly regulated by the daily impact of gravity.

In addition to his space biology research, Baldwin has been funded continuously for over 25 years by both the National Institute of Heart, Lung, and Blood Diseases and the National Institute of Arthritis, Musculoskeletal, and Skin Diseases (NIAMS). This research has focused on interactive studies concerning hormonal and of activity/inactivity factors in the regulation of striated muscle myosin heavy chain (MHC) gene expression. Baldwin and his research group are currently focused on the transcriptional regulation of the MHC gene family of motor proteins and have published extensively on this general theme in both the *American Journal of Physiology* and the *Journal of Applied Physiology*.

Based on his expertise in muscle biology, Baldwin has served key roles in the program activities and advisory councils of both the NIH and NASA. From 1987-1991 he served on the NIH Respiratory and Applied Physiology Study section, and he recently was appointed as a founding member and then chair of the recently formed Skeletal Muscle and Exercise Physiology (SMEP) Study Section. Also, he has served on several strategic planning workshops and Task Forces for NIAMS. Also, he served on the jointly sponsored NIH/NASA Biomedical and Behavioral Advisory Committee, which fosters joint research activities between the two agencies.

Within NASA, Baldwin chaired the Life Sciences Advisory Committee from 1994-2000; and completed service as chair of the Biological and Physical Research Advisory Committee (1999-2004). More recently, he was appointed to the NASA Advisory Council, which is the highest ranking advisory group within the space agency. In 2000, he was appointed as the Muscle Atrophy Team Leader for overseeing countermeasure-related research within the NASA sponsored National Space Biomedical Research Institute. Based on his research and advisory committee service to NASA he was awarded NASA Public Service Medals in both 1999 and 2005

Over the years Baldwin has received several awards for his service and research activities including the NASA Group Achievement Award in Spacelab Sciences in 1992, the American College of Sports Medicine Citation Award in 1993, the APS Edward Adolph Award in Exercise and Environmental Physiology in 1998, and the APS EEP Honor Award in 2006.

Since becoming the Chair of the SAC, Baldwin has become an active participant of the APS Council (ex-officio) and participated in a long-range strategic planning retreat which took place in October 2005. As part of implementing many of the outcomes of this important event, Baldwin's goal is to establish better intra- and inter-sectional cohesiveness and synergy among the various sections that serve as the underpinning of the APS. Baldwin is eager to infuse the next generation of leaders within the sections as well as to encourage greater international participation within the workings of the Society given the strong international component of the membership. Baldwin is also looking for avenues to providing more opportunities for oral presentations, especially by young gifted scholars, among the EB meeting program activities. Given the long history of successful APS sponsored specialty conferences, a major goal during Baldwin's tenure as SAC chair is to somehow revive this history by encouraging collaborative projects and formal meetings among those sections that have natural scientific affinities with one another given the reality that in order for the APS to thrive in the future its membership must find more common ground in working with one another in both the social and intellectual settings of research integration. ❖

Introducing Angela Grippo

On January 1, 2006, **Angela Grippo** succeeded **Caroline Sussman** as Chair of the Trainee Advisory Committee (TAC). Grippo has served as a TAC member since 2003, as the representative for the Neural Control and Autonomic Regulation section. Grippo also served as the Trainee Member of the Neural Control of Autonomic Regulation Steering Committee from 2002-2006. She is currently an ex-officio member of the Career Opportunities in Physiology Committee.

Grippo is a postdoctoral fellow in the Department of Psychiatry and Brain-Body Center at University of Illinois at Chicago. She graduated summa cum laude from Drake University (Des Moines, IA) with a BS in Psychology in 1998. She was awarded a National Institutes of Health (NIH) fellowship during her graduate studies at The University of Iowa (Iowa City, IA) in the laboratory of Alan Kim Johnson, and received a PhD in Psychology in 2003. Grippo then completed a one-year postdoctoral fellowship at Loyola University Medical Center (Maywood, IL) in the laboratory of Louis Van de Kar. She has been a NIH-sponsored postdoctoral fellow in the laboratories of Sue Carter and Stephen Porges at the University of Illinois at Chicago since 2004.

Grippo's research is focused on mechanisms underlying psychological disor-



Angela Grippo

ders and cardiovascular regulation, with a primary emphasis on the association of mood disorders and heart disease. Grippo uses an integrated approach involving behavioral, physiological, and neural techniques to understand the mechanisms involved in the link between psychology and physiology. Her current studies are investigating the role of autonomic and neuroendocrine processes in depression, anxiety, and cardiovascular regulation.

The TAC was created in 2003 as an effort to increase the participation of

early-career scientists in APS. The Committee is charged with investigating the needs of early-career scientists and creating programs to support these members of APS. The TAC also advises Council on issues relating to the needs of the early-career members in APS. During the next few years, the TAC will focus on enhancing its relations with other APS committees by collaborating on projects, creating trainee-relevant topics for presentation at scientific meetings, and encouraging several APS committees to include trainee members. Additionally, the TAC will soon launch a new website that focuses on issues specifically relevant to early-career scientists. The Committee plans to continue its distribution of a trainee-specific newsletter, and will continue to present trainee-relevant topics at the Experimental Biology meeting. The TAC will also strive to continually improve the environment for trainees by encouraging participation of trainees in APS activities, developing programs and disseminating literature regarding career enhancement and practical issues relevant to trainees, and collaborating with national organizations that are also invested in trainee advancement. These activities will enhance the development of early-career members of APS and will ensure a successful future for the society and its members. ❖

The American College of Sports Medicine Joins FASEB

The Federation of American Societies for Experimental Biology (FASEB) is pleased to admit the American College of Sports Medicine (ACSM) into the Federation. In reference to this event, FASEB President Bruce Bistrian, said, "It is an honor to welcome the committed health and fitness scientists of ACSM to FASEB." The FASEB Board voted on December 9, 2005, to accept ACSM as a member society in the coalition.

"Linking ACSM's mission and resources with those of FASEB means several things," said Carl Foster, ACSM President and a Fellow of the College.

"This partnership opens the door for a wealth of programs that will benefit both organizations and the public we serve. We look forward to a fertile exchange through meetings, conferences, workshops, and informal, one-on-one contact." ACSM was founded in 1954 and has more than 20,000 active members. It is the largest sports medicine and exercise science organization in the world. Members of ACSM aim to increase public awareness and education about the positive aspects of physical activity for people of all ages from all walks of life.

FASEB is composed of 22 societies with more than 80,000 members, making it the largest coalition of biomedical research associations in the United States. FASEB's mission 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 serves the interests of these scientists in those areas related to public policy, facilitates coalition activities among Member Societies and disseminates information on biological research through scientific conferences and publications. ❖

APS Membership Survey Analysis

A total of 1,782 members replied to the survey; 73% male and 27% female. Of the 1,782 respondents, 326 are age 35 or under. Most APS members (72%) work in the United States; however, 28% of the Society's members work outside of the US. Those countries with the largest number of APS members, per the survey responses, are Canada, Japan, United Kingdom (England, Scotland, Ireland), and Germany.

More female respondents than males indicated that they had been a student member of APS (46.5% vs. 30.9%), and 79% of members age 35 and under had been a student member before becoming a regular member.

Fifty percent of the respondents indicated that their primary work is research (70% or more of their time), while only 5% of the respondents indicated that the majority of their time is spent teaching.

Respondent Demographics

Profession

| | |
|--------------------|-----|
| Research scientist | 50% |
| Educator | 25% |
| Administrators | 18% |
| Clinical | 14% |
| Other | 14% |

Primary Institution

| | |
|----------------------------------|------|
| Academic Institution | 88% |
| Industry | 3.5% |
| Independent Research Institution | 2.2% |
| Government | 2.9% |
| Other | 3.4% |

Type of Degree

| | |
|--------|-----|
| PhD | 66% |
| MD | 11% |
| MD/PhD | 13% |
| Other | 10% |

Note: The percentages in the following tables are based on the total number of respondents in that particular age category. (i.e., 72% of males in the 66-85 age category indicated they are professors).

Section Affiliation

The largest section affiliation of the respondents is the Cardiovascular section (23.5%), while the Cell & Molecular Physiology section ranks second with 12.1% of the respondents. The next three largest sections are the Endocrinology & Metabolism Section, Respiration Section, and the Environmental & Exercise Section.

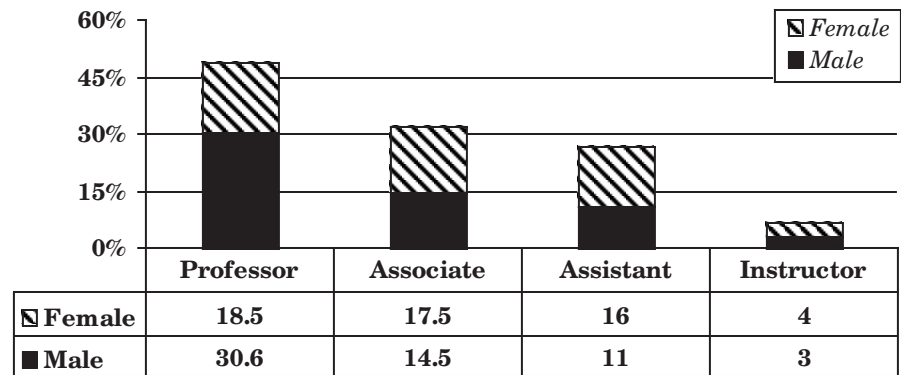


Figure 1: Academic Appointment by Gender (all respondents).

Services and Products

The AJP journals were rated highly in terms of their value to the APS members. *AJP - Heart and Circulatory Physiology* was ranked higher than the other AJP journals, which is expected as the Cardiovascular Section is the largest section in APS. *Physiological Genomics* was ranked high by 76% of the respondents, with the *Journal of Applied Physiology* being the next highest ranked publication in order of importance. Approximately 65% of the members consider *Physiology* (formerly *NIPS*) to be an important publication of the Society. Most respondents (29%) only ranked the Sections' newsletters of average importance.

The Experimental Biology meetings were ranked by 68% of the respondents as being an important benefit to them, while the Society's conferences/intersociety meetings only received an average rating in importance as a Society service or benefit. However, 54% of members under age 35, ranked the conferences high in importance.

APS Online Resources/Services

The free online journal subscription service was ranked highest by respondents in terms of its value to the members, with the

online FASEB directory and the APS Members-only website being the next two highest ranked services in order of importance to the members. More than 30% of the respondents had no opinion on the Section listservs, and only 8% believed it to be an important service. At least one third of the respondents indicated that the mentoring website and program was not of high importance, and 29% had no opinion on the program. Surprisingly, only 35% of younger members ranked this service high in importance, and 33% had no opinion of the service.

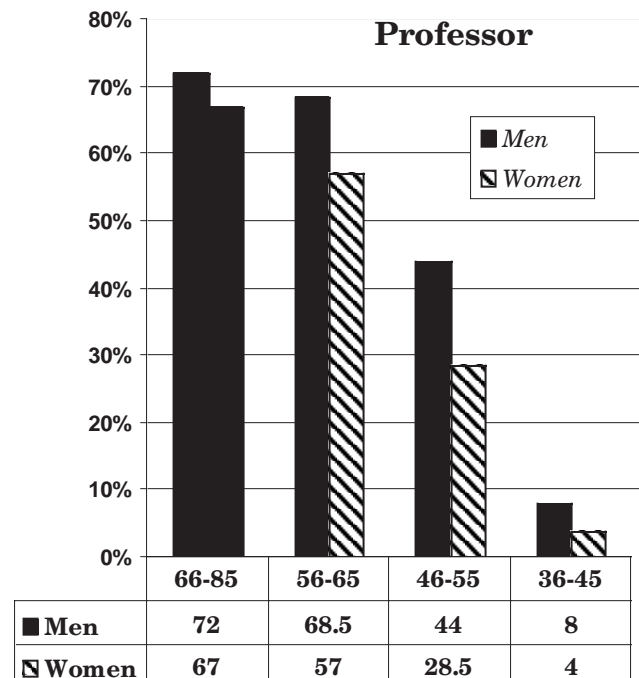


Figure 2: Professor by Age and Gender.

Other Services

The APS website and discounted meeting registration were the two highest ranked benefits/services based on their value to the members. The least valued service is the Society's Book Program.

Dues and Fees

More than half of the respondents indicated that they pay for their APS membership dues (60%), but less than 20% pay for their meeting registration fees, and only 10% personally pay their author fees.

The following suggestions were made regarding APS services and products:

"The EB meeting does not come across as a meeting where all topics published in the APS journals are addressed."

"Discount meeting registration for members is still expensive for developing countries."

"At the EB meetings, APS and ASNS have many symposia topics that overlap and are programmed at EB at competing/conflicting times."

"Many services are unknown or are not helpful to non-US investigators."

"Student members do not benefit immensely from the APS Awards Program as compared to the regular members."

"The Awards Program should be opened to all members regardless of country and there should be a cap on travel awards."

"APS needs more postdoctoral programs for non-minorities."

Meetings and Conferences

An average, 32% of the respondents attended an EB meeting within the past five years. The three most cited reasons for attending were the symposia program, the poster sessions, and the featured topic sessions. The younger respondents rated those three reasons highly as well as the networking opportunities presented at the EB meetings. Only 32% of the younger respondents rated FASEB job placement fair/place-ment service high in importance.

The majority of respondents who attended an EB meeting indicated that the All-APS email messages, *The Physiologist*, and the APS website or other websites were their primary sources of obtaining information for APS meetings.

The two most cited reasons for not attending the EB meetings were limited travel budget and personal commitments; and for the younger members it was limited travel budget and meeting content. This was also true for the younger respondents. Less than 1% of the respondents cited post 9/11 safety concerns as a reason for not attending the meetings. These same two reasons were most cited by respondents for not attending any of the APS conferences held over the past three years.

APS Journals

The majority of respondents (93%) indicated that they do access the APS journals online. The percentage was slightly higher for younger members. Although 54% of respondents rated the

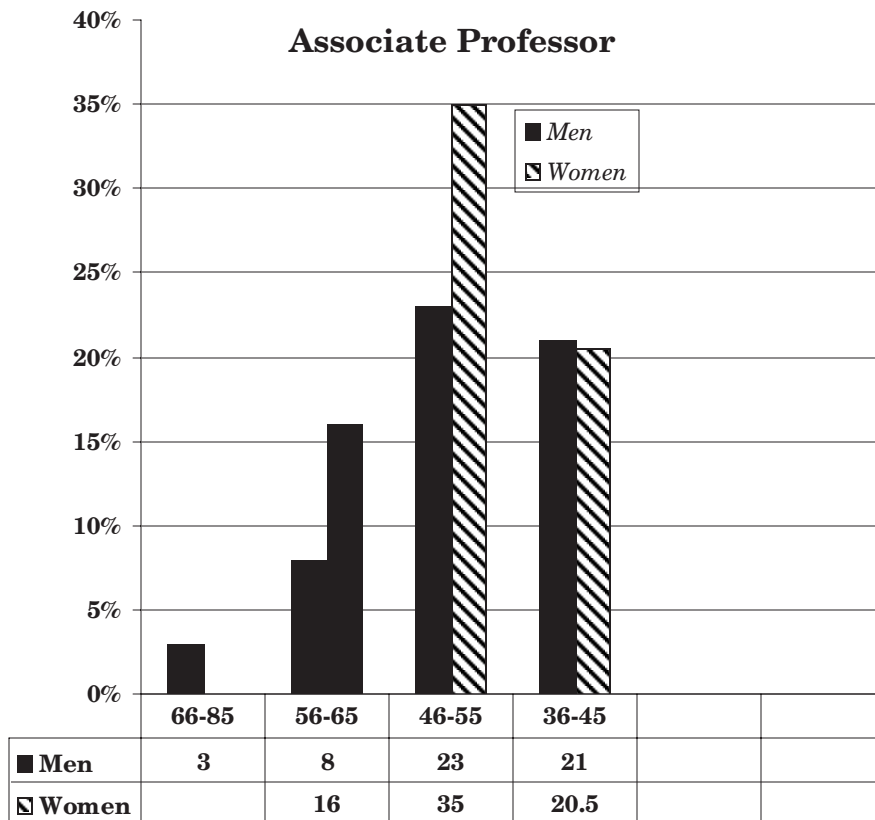


Figure 3: Associate Professors by Age and Gender

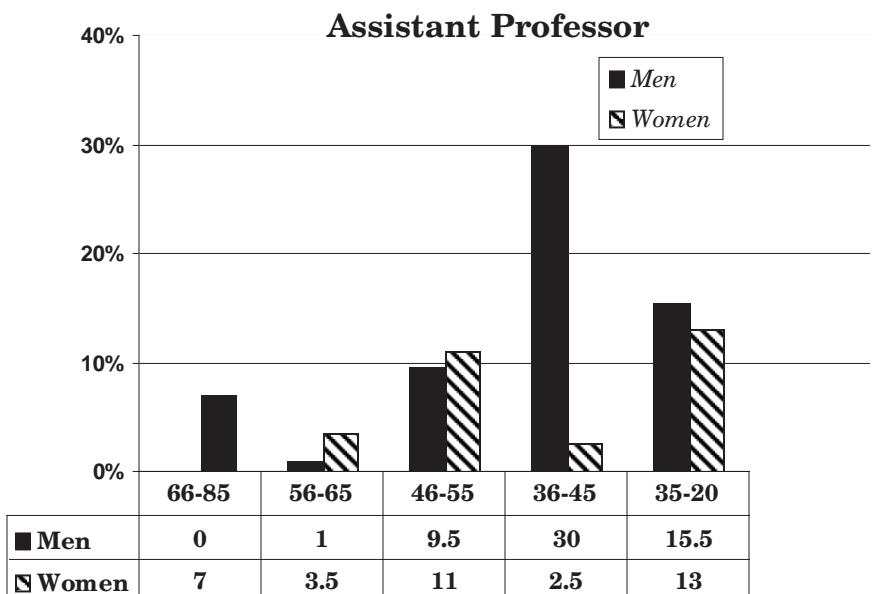


Figure 4: Assistant Professor by Age and Gender

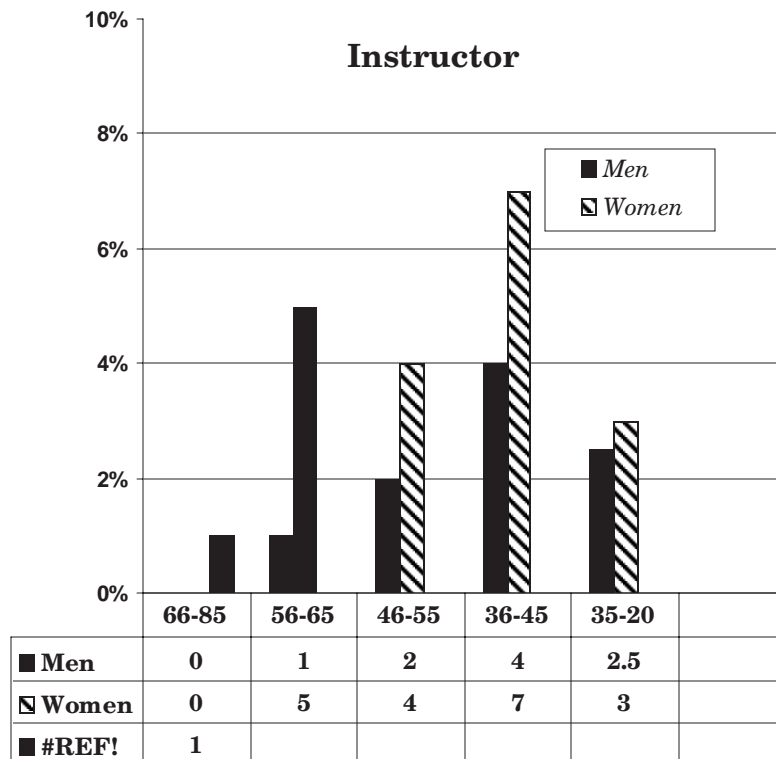


Figure 5: Instructor by Age and Gender

overall quality of the online journal system high, 75% indicated that APS should continue publishing printed versions of the journals. Respondents also rated high the quality of the peer review system and the quality of copy-editing services.

More than 60% of the respondents indicated that they have submitted at least

one manuscript to an APS journal within the past three years, while more than 50% of the respondents have published at least one manuscript in an APS journal within the past three years. In the past three years, nearly 50% of the respondents have served as a reviewer, 12% have served on an editorial board, but only 3% have served as an editor/associate editor for an APS journal.

When comparing the APS journals against competing journals, 22.6% indicated that the APS journals are better than the competitors', and 35.1% said that the APS journals are equal to those of the competitors'.

Advances in Physiological Education

Just over half of the respondents (56%) indicated that they read/use the print version of *Advances* in

Physiological Education, however, about 1/3 indicated that they did not read or use the publication at all. More than half of those that read *Advances* indicated that they would be happy with using the online version only, allowing APS to stop publishing a print version.

Education and Careers Program

Overall, the education activities were rated of equal importance, with only developing new teaching resources for undergraduate and graduate physiology being ranked slightly higher than the other programs. Members of the Teaching Section ranked the activity of providing an online clearinghouse and archive of teaching resources as the most important. All of the respondents, including the Teaching Section members, ranked the program "developing outreach programs for K-12 teachers and students and developing new physiology teaching resources for K-12 science education" as the least important program.

Respondents made the following suggestions regarding the APS education programs:

"Older published materials could be re-purposed for other audiences (Neural networks/Physiology of fitness background information for non-majors college physiology lab background information, etc.)."

"Communicate and coordinate with Chapters on Refresher courses so the Chapters can use material presented at the national meetings.

"Correlation of lessons to NCATE and NSES standards and assuring that these are the essential and primary criteria for lesson development (rather than, for example, what might be 'interesting' to students)."

"Hold workshops during the summer so members unable to attend the EB meetings can have the opportunity to attend the workshops."

Respondents ranked high all of the career-related programs. The two programs receiving the highest rating from both the overall group of respondents and the younger group were "providing an online meeting and discussion forums for physiology trainees," and "Publicizing job opportunities in the physiological sciences." The program that received the lowest ranking by both groups was "developing examples of career paths (personal vignettes) as models."

Respondents made the following suggestions regarding the APS career-related programs:

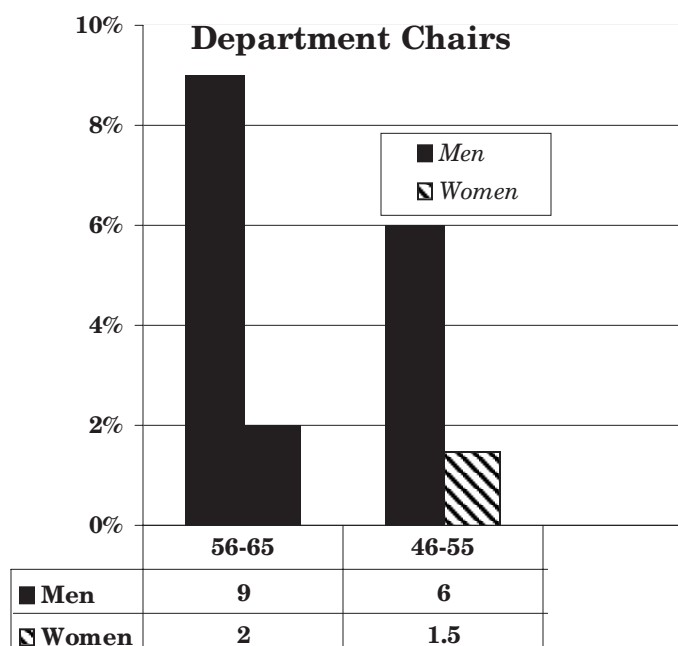


Figure 6: Department Chairs by Age and Gender

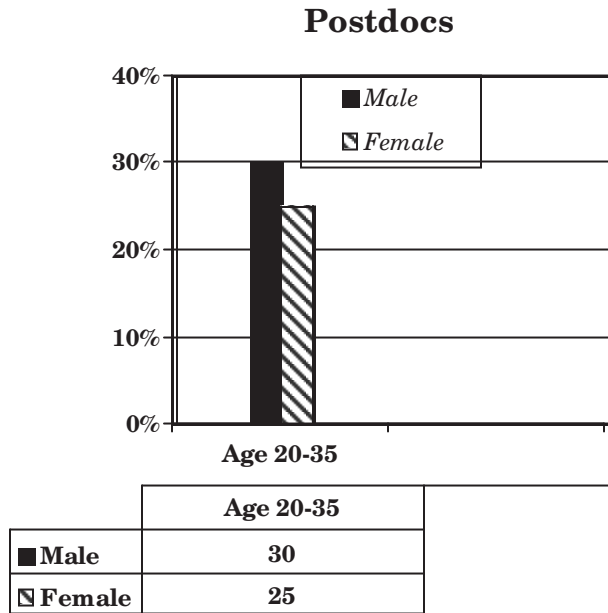


Figure 7: Postdocs age 20-35

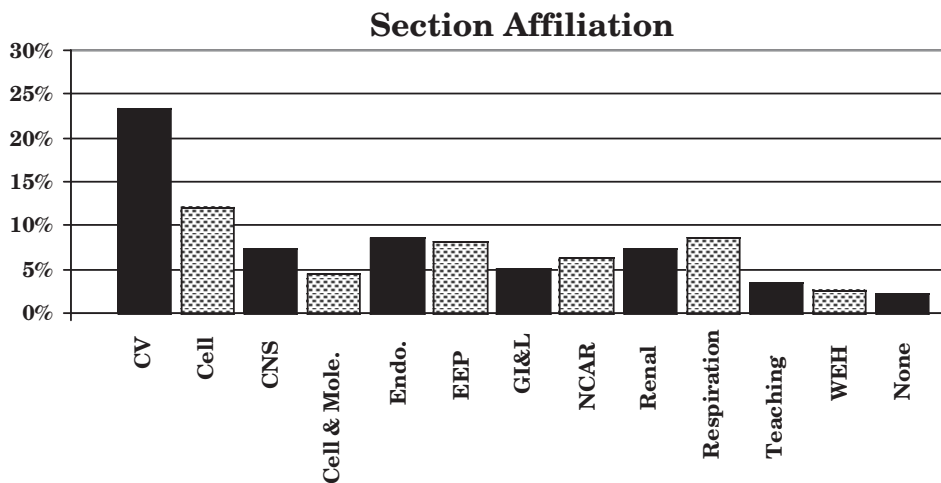


Figure 8: Section Affiliation (total respondents)

- Guidance for mid-career.
- Alternate career path mentors.
- Encourage the private sector to do more recruiting at EB meetings.
- Programs for retired members.

Public Affairs

Approximately half of the respondents indicated that federal funding levels and Peer Review/Study Section Procedures are very important public affairs issues. Two other public affairs issues-Trend from individual grants to teams, centers, etc., and agency funding priorities-were issues of high importance. However, about 16% of the respondents had no opinion on the importance of any of these issues.

The overall issue of animal use in research is important to the respondents, with 53% of the respondents listing government regulations as one of the major concerns with regards to the use of animals. The other concerns pertaining to animal use in research-IACUC Review Issues, Policies at institutions, and activist intimidation of researchers-were ranked about equal in terms of importance. It is surprising to note that approximately 16% of the overall respondents, and almost 19% of the younger members, did not have an opinion on any of the animal research issues.

NIH has been the primary source of funding for many APS members over the past five years. Of those respondents whose main source of funding was from one of the NIH institutions, 65% received their majority of funding from the National Heart, Lung and Blood Institute (NHLBI), and 63.5% received their main source of funding from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The National Institute of Child Health and Human Development (NICHD) and the National Institute of General Medical Sciences (NIGMS) were identified as the next two most significant sources of funding.

The National Science Foundation has also been a significant source of funding for APS members over the past five years. From those voluntary health agencies that fund research, APS members have received

| Journal | All Respondents | | | | Respondents 35 and younger | | | |
|---|-----------------|-----------|-----------------|--------------|----------------------------|-----------|-----------------|--------------|
| | % Satisfied | % Neutral | % Not Satisfied | % No Opinion | % Satisfied | % Neutral | % Not Satisfied | % No Opinion |
| <i>The Physiologist</i> | 44 | 31 | 20 | 5 | 49 | 24 | 15 | 12 |
| <i>Physiology</i> (formerly <i>NIPS</i>) | 65 | 20 | 10 | 5 | 63 | 21 | 7 | 9 |
| <i>Advances</i> | 35 | 24 | 32 | 9 | 39 | 22 | 26 | 13 |
| Section Newsletters | 31 | 29 | 29 | 11 | 31 | 27 | 22 | 20 |

| | All Respondents | | | | Respondents 35 and younger | | | |
|------------------------------|-----------------|-----------|-----------------|--------------|----------------------------|-----------|-----------------|--------------|
| | % Satisfied | % Neutral | % Not Satisfied | % No Opinion | % Satisfied | % Neutral | % Not Satisfied | % No Opinion |
| Experimental Biology Meeting | 68 | 14 | 10 | 8 | 77 | 7 | 3 | 13 |
| Conference/InterSociety Mtg. | 44 | 22 | 18 | 16 | 54 | 14 | 6 | 26 |

| Journal | All Respondents | | | | Respondents 35 and younger | | | |
|--------------------------------------|-----------------|-----------|-----------------|--------------|----------------------------|-----------|-----------------|--------------|
| | % Satisfied | % Neutral | % Not Satisfied | % No Opinion | % Satisfied | % Neutral | % Not Satisfied | % No Opinion |
| <i>Journal of Applied Physiology</i> | 58 | 13 | 16 | 13 | 59 | 14 | 10 | 17 |
| <i>Journal of Neurophysiology</i> | 36 | 15 | 30 | 19 | 40 | 15 | 24 | 21 |
| <i>Physiological Genomics</i> | 34 | 18 | 26 | 22 | 43 | 16 | 17 | 24 |
| <i>Physiological Reviews</i> | 16 | 12 | 6 | 6 | 16 | 10 | 4 | 10 |
| <i>Articles in Press</i> | 52 | 13 | 16 | 19 | 59 | 13 | 6 | 22 |

the largest percentage of funding from the American Heart Association (AHA).

Communications

Slightly more than half of the respondents (56.5%) rated accurate reporting of physiological research in the public media as the most important issue, and public understanding as the next most important issue (44%).

How can APS be more responsive to your professional needs?

Although many respondents indicated that APS is doing a good job in meeting their professional needs, others made offered recommendations on what APS could do better.

Recommendations:

More interaction with other interna-

tional societies.

Improve the impact factors of the APS journals.

More fully integrate international members into the Society.

Bridge industry with research and clinical practice.

Expand interest and inclusion of veterinary physiologists.

Provide more support to young investigators.

Lobbying for increased funding for NIH.

Encourage medical students and residents to pursue careers as physician scientists that encompass physiology.

Do a better job in promoting physiology to undergraduate students, as well at the lay public.

Publicizing grant opportunities.

Smaller, more focused meetings like the APS conferences.

What would you say is the single most important reason for belonging to APS?

The two most cited reasons for joining APS (or renewing membership) are the APS publications and the EB meetings. Other reasons included:

Fellowship of physiological community

Professional loyalty; supporting the profession

Networking

Teaching resources

Prestige of belonging to a professional society

Free color

Reduced page charges

Job opportunities

Dissemination of information including developments in the profession, physiology education, and political climate

Lobbying efforts in Congress.

Programs in the Education Department

In 2005, the APS leadership will develop a five-year Strategic Plan. What do you think are the important directions, initiatives, and/or programs to include in that plan?

Survey respondents offered the following recommendations for what they believe APS should focus on during the next five years:

Recommendations:

Integration with other professional societies, including international societies.

Keep physiology at the forefront of science and emphasize its importance in medicine.

Alternate careers for physiologists.

Increased funding for NIH, NSF, and VA (government funding and alternate sources of funding).

Maintaining high quality of journals.

Promoting physiology.

Expanding work in undergraduate education to attract more students to physiology.

Continued education of the lay public about the importance of physiology and the need for animal research.

Increase interest and awareness of physiology at the K-12 levels.

Increasing the impact factors of the journals.

Promotion of integrative and translational physiology.

Improve the EB meetings. ❖

NIH Funding

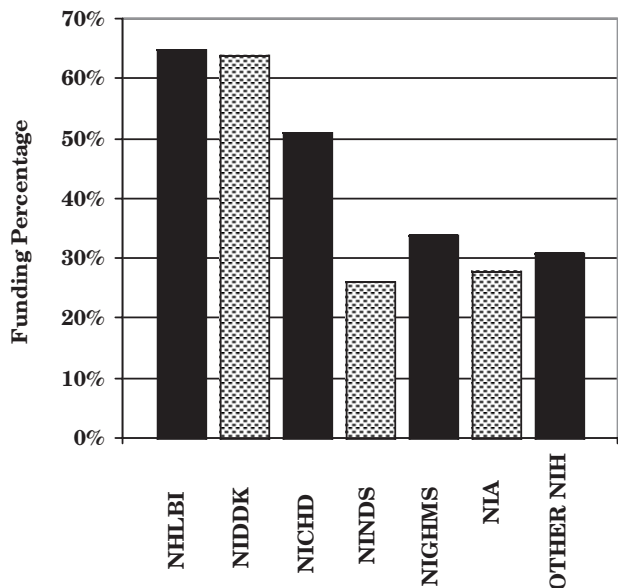


Figure 9: Major Sources of NIH Funding.

New Regular Members

*Transferred from Student Membership

Ellen Adele

Univ. of North Texas HSC, Fort Worth

Rexford S. Ahima

Univ. of Pennsylvania, Philadelphia

Lida Anestidou*

Vanderbilt Univ. Med. Ctr., TN

Habib R. Ansari

West Virginia Univ., Morgantown

Maria M. Anton*

Medical College of Wisconsin

David J. Baker

Univ. of Calgary, Canada

Veeramuthu Balakrishnan

Oregon Health & Sci. Univ.

George Michael Balanos

Univ. of Birmingham, UK

Olivier Barnard

Faculte Des Science Du Sport, France

Christina Noel Bennett*

NIH, Bethesda, MD

Krista Natasha Blackwell*

Medical Univ. South Carolina

Qi Cai

Univ. of Arizona Coll. Med.

Cecilia M. Canessa

Yale Univ., CT

Chun Mei Cao*

Peking Univ., Beijing, China

Chunhua Cao

Univ. of Maryland, Baltimore

Carlo Capelli

Univ. of Opudwe, Italy

Guangping Chen

Emory Univ., GA

Ed W. Childs

Texas A&M Hosp., Temple

Yang-Ling Chou*

Univ. of Florida

Gordon Cramb

Univ. of St. Andrews, Fife, UK

Kevin Michael Crisp

St. Olaf College, Northfield, MN

Rochelle Marie Cunningham

Univ. of Maryland, Baltimore

Rory Curtis

Elixir Pharmaceuticals, Cambridge, MA

Christiane E.L. Dammann

Tufts Univ., New England Med. Ctr., MA

Stephen Mark Deban

Univ. of South Florida, Tampa

Matthew J. Delmonico

Univ. of Pittsburgh, PA

Scott E. Diamond

Univ. of Kentucky

Mary E. Dickinson

Baylor College of Med., TX

Ikechukwu I. Ekekezie

Children's Mercy Hosp., MO

Jaafar Fadl El Annan*

Massachusetts Gen. Hosp., Boston

Deborah L. Enns*

Wilfrid Laurier Univ., ON, Canada

Gladys Patricia Escobar

Univ. of Texas HSC, San Antonio

Miriam Irene Frommer

Univ. of Sydney, Australia

Satoshi Fujita*

Univ. of Texas Med. Branch, Galveston

Lie Gao

Univ. of Nebraska, Omaha

Christina C. Gyenge

Univ. of Bergen, Norway

Richard Hall

Univ. of the Virgin Islands, St. Thomas

Nian-Lin Reena Han

National Univ. of Singapore

Craig John Hanke

Univ. of Wisconsin, Green Bay

Rodney Allen Hill

Univ. of Idaho

Taku Hirata

Kyorin Univ. Sch. Med., Tokyo, Japan

Ugur Hodoglugil

Univ. of California, San Francisco

Andrea G. Hohmann

Univ. of Georgia, Athens

Harry Holthofer

Univ. of Helsinki, Finland

Kuang-Tse Huang

National Chung Cheng Univ., Taiwan

Masashi Ichinose

Kobe Univ., Japan

Richard Andrew Jaffe

Stanford Univ., CA

Wilfrid F. Janig

Christian-Albrechts Univ., Germany

Yijun Jin*

Louisiana State Univ.

Andrew Robert Judge*

Boston Univ., MA

Sharon Phaneuf Judge*

Boston Univ., MA

Peter J. Kahrilas

Northwestern Univ., Chicago, IL

Constantinos Kallaras

Aristotle Univ., Thessaloniki, Greece

Sabine Kastner

Princeton Univ., NJ

Mitsuo Kawato

ATR Comput. Neurosci. Labs, Japan

Steve A. Kay

The Scripps Res. Inst., La Jolla, CA

Erin Marie Keen-Rhinehart*

Emory Univ., GA

Jason K. Kim

Penn State Univ. Coll. Med.

Sangho Kim

Univ. of California, San Diego

Jeffrey Kingsbury

Mohave Comm. Coll., AZ

Takuya Kishi*

Kyushu Univ., Fukuoka, Japan

Maria Knikou

City Univ. of New York, Staten Island

Marko A. Kryworuchko

Children's Hosp., Ottawa, Canada

Carol A. Lewis

Adis Communications, Yardley, PA

Juan J. Loor

Univ. of Illinois

David Andrew Low

Inst. for Exer. Environ. Med., TX

Chao Ma

Yale Univ., CT

Thomas Joseph Mariani

Brigham and Womens' Hosp., MA

Tamara L. Mau*

Univ. of California, Berkeley

Joseph M. McClung*

Univ. of Florida

Kaihong Mi

Univ. of Alabama, Birmingham

Barbara A. Miller

Penn St. Univ Coll Med.

Mary Courtney Moore

Vanderbilt Univ. Sch. of Med., TN

Susumu Mukai

Mikai Clinic, Yamato Kanagawa, Japan

Surya M. Nauli*

Harvard Med. Sch., Boston, MA

Wijitha U. Nilaweera

Iowa State Univ.

Elizabeth L. Noelke

Texas Lutheran Univ.

Thomas V. Nowak

Central In Gastro. Group, IN

Rikuo Ochi

Univ. of California, San Diego

Yasuo Ogawa

Juntendo Univ., Tokyo, Japan

Hiroshi Okamoto

Toyama Prefectural Univ., Japan

Leo Edmond Otterbein

Harvard Med. Sch., MA

Yan-Xia Pan

Univ. of Nebraska Med. Ctr.

Gladys Pearson

Inst. Clin. Res. Human Movement, UK

Veronica A. Peotta

Univ. of Iowa

Ole Holger Petersen

Univ. of Liverpool, UK

Frances Ruth Ragsdale

Winona State Univ., MN

Niwanth W. Rajapakse

Medical Coll., Milwaukee, WI

Andrew D. Ray*

Univ. of Buffalo, NY

Preston B. Rich

Univ. of North Carolina

Caroline A. Richards

US Army Inst. of Surgery Research, TX

Jorge T. Riera

Tohoku Univ., Sendai Miyagi, Japan

Jason M. Roper*

Wil Res Labs., LLC, OH

Stefan W. Ryter

Univ. of Pittsburgh, PA

Reena Sandhu

ApoPharma Inc., Toronto, Canada

Jennifer Mayberry Sasser*

Univ. of Florida

Irawan Satriotomo

Univ. of Wisconsin, Madison

Felix E. Schweizer

David Geffen Sch. of Med., CA

Anne B. Sereno

Univ. of Texas, Houston

Hakki Oktay Seymen

I.U. Cerrahpasa Med. Fac., Turkey

Yuan Shen

NIH/NHLBI, Bethesda, MD

Shigeki Shibata

Inst. Exercise & Environ. Med., TX

Samir Kumar Sil

Tripura Univ., Agartala, India

Eric Michael Snyder*

Mayo Clinic, MN

Hong Song

Univ. of Maryland, Baltimore

Hideaki Soya

Univ. Tsukuba, Ibaraki, Japan

Paul J. Stapley

McGill Univ., Montreal, Canada

Christopher T. Steele

Naval Sub. Med. Res. Lab., Groton, CT

Nicole Rebecca Stob

Univ. of Colorado, Boulder

April D. Strader

Southern Illinois Univ. Sch. Med.

Yao Sun

Univ. of Tennessee, Memphis

Laura L. Symonds

Michigan State Univ., East Lansing

Zhiyong Tan

Univ. of Iowa

Veronica A. L. Toppin*

Univ. of Alaska, Fairbanks

Nelly Valkova

Univ. of California, Davis

William B. Van De Graaff

E.J. Hines Hosp./Loyola Univ., IL

Darin Lee Van Gammeren*

Boston Univ., MA

P. Ashley Wackym

Medical Coll. of Wisconsin, Milwaukee

David Alan Wagner

Metabolic Solutions Inc., Nashua, NH

Edward Joseph Walsh

Boys Town Nat'l. Res. Hosp., NE

Qin Wang

Univ. of Alabama, Birmingham

Anna M. Watson*

Howard Florey Inst., Parkville, Australia

Aron Weller

Bar-Ilan Univ., Ramat-Gan, Israel

Rolf H. Westgaard

Norwegian Univ. Sci & Tech.

Douglas G. Whyte*

Univ. of Melbourne, Parkville,
Australia

Carol Ann Witczak*

Joslin Diabetes Ctr., Boston, MA

Donghua Xie

Duke Univ. Med. Ctr., Durham, NC

Eric D. Young

Johns Hopkins Med. Sch., MD

Alexandra Zahradnikova

Slovak Academy of Scis., Bratislava

Jin Zhang

Univ. of Maryland, Baltimore

Yu-Dong Zhou

Boston Univ., MA

New Student Members

Joanna Abrams

Univ. of Minnesota

Zhibo An

Vanderbilt Univ. Med. Ctr., TN

Daniel Asgeirsson

Univ. of Lund, Sweden

Manish Bhutada

Univ. of Sydney, Australia

John Chrisholm

Napier Univ., UK

Nektarios Christodoulou

Harokopio Univ., Greece

Yodying Dangprapai

Univ. of Arizona

Suchitra Deolalikar

Univ. of Hawaii, Manoa

Kathryn Dunn

Medical College of Wisconsin

Jason Edwards

Indiana Univ.

Matthew Forss

Northern Michigan Univ.

Bruk Getachew

Howard Univ., DC

Heath Gasiel

Texas A&M Univ.

Zhizhan Gu

Brown Univ., RI

Alton Hiscox

Univ. of Arizona

Xin Long

Indiana Univ.

German Lopez-Riquelme

Univ. Natl. Autonoma, Mexico

Kenyatta Lucas

Rutgers Univ., NJ

Jessica Martel

Dartmouth Med. School, NH

Gregg McCord

Univ. of Oregon

Abigail Milewski

Cornell Univ., NY

Lois Felipe Miranda

Univ. Peruana Cayetano Heredia, Peru

Johnnie Moore

St. Louis Univ. Sch. of Med., MO

Mbiydzennyuy Ngala

Ahmadu Bello Univ., Nigeria

Kristy Nicks

Univ. of Arkansas for Med. Sci.

Ryan Nowak

Univ. of Colorado HSC

Adrienne Orr

Stanford Univ., CA

Beatriz Pagan

Ponce Sch. of Med., Puerto Rico

Nicholas Pullem

Virginia Commonwealth Univ.

Siavash Saadat

Georgetown Univ., DC

Julie Self

Emory Univ., GA

Zachary Sellers

Univ. of Illinois, Urbana, Champaign

Elisabeth Seymour

Univ. of Michigan

Nadeem Sheikh

Univ. Hospital, Germany

Latasha Smith

Univ. of Arkansas

Kristen Stedenfeld

Univ. of Pittsburgh

Irina Szasz

Michigan State Univ.

Pooja Talauliker

Univ. of Kentucky

Yue Wang

Indiana Univ.

Megan Wenner

Univ. of Delaware

Tamara Zaobornyj

Univ. of Buenos Aires, Argentina

Apostolos Zarros

Medical Sch. of Athens, Greece

New Affiliate Members

Robert Anzalone

Hesser College, Manchester NH

Nancy Marsh

Cuesta College, Paso Robles, CA

Adelle Schade

Conrad Weiser High Sch., Robesonia PA

Andres Smith-Sobieraj

Brown Univ., Providence RI

Michael Spitz

Canton High School, Canton, MI

Recently Deceased Members

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Montreal, Canada

Domingo M. Aviado

Short Hills, NJ

Habeeb Bacchus

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Thomas A. Borgese

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Waban, MA

Theodore H. Bullock

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Harry J. Carlisle

Santa Barbara, CA

Florent Depocas

Helsinki, Finland

Robert G. Ellison

Evans, GA

Paul J. Flakoll

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Marc A. Nathan

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Sun City, AZ

Jean M. Posternak

Geneva, Switzerland

Joseph Schiller

Paris, France

Stewart Wolf

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Bowditch Award Lecture

The Bowditch Lectureship is awarded to a regular member, under 42 years of age, for original and outstanding accomplishments in the field of physiology. Selected by the APS President, the recipient presents a lecture at the Experimental Biology meeting, which is considered for publication in the Society journal of their choosing. The recipient receives an honorarium of \$2,500, reimbursement of expenses incurred while participating in the Experimental Biology meeting, and a plaque. The membership is invited to submit nominations for the Bowditch Lecturer. A nomination shall be accompanied by a candidate's curriculum vitae and one letter detailing the individual's status, contributions, and potential.

More information on the award and nomination procedures are available at <http://www.the-aps.org>. Nominations should be sent to: The APS Bowditch Lecture Award, c/o Linda Jean Dresser, 9650 Rockville Pike, Bethesda, MD 20814-3991; or submitted online at http://www.the-aps.org/cgi-bin/Election/Lecture_form.htm.

Physiology in Perspective

Walter B. Cannon Memorial Lecture

The Cannon Memorial Lecture, sponsored by the Grass Foundation, honors Walter B. Cannon, President of the Society from 1913-1916, and is presented annually at the spring meeting to an outstanding physiological scientist, domestic or foreign, as selected by the President-Elect with the consent of Council. The recipient presents a lecture on "Physiology in Perspective," addressing Cannon's concepts of "The Wisdom of the Body." The lecture is considered for publication in the Society journal of their choosing. The recipient receives an honorarium of \$4,000, a plaque, and reimbursement of expenses incurred in association with delivery of the lecture. The membership is invited to submit nominations for this lecture. A nomination shall be accompanied by a candidate's curriculum vitae and one letter detailing the individual's status and contributions.

More information on the award and nomination procedures are available at <http://www.the-aps.org>. Nominations should be sent to: The APS Cannon Lecture Award, c/o Linda Jean Dresser, 9650 Rockville Pike, Bethesda, MD 20814-3991; or submitted online at http://www.the-aps.org/cgi-bin/Election/Lecture_form.htm.

NIH Funding Trends in Physiology

Pam Bounelis and Dale Benos

The National Institutes of Health (NIH) is the nation's largest funding source for biomedical research. On the heels of the NIH budget cut in 2006, President Bush recently proposed a budget freeze for NIH in 2007 (1). The Federation for the American Society for Experimental Biology "believes that flat or reduced funding of NIH will serve to slow the rate of research discovery, erode the gains made in the past decade, and discourage the best and brightest from scientific careers" (2). With the recent attention on the NIH budget and concern for the impact of an NIH budget that does not keep pace with inflation, an analysis

of NIH funding trends for investigators in physiology was undertaken.

What types of schools have NIH-funded investigators in physiology departments?

To obtain the broadest view of NIH funding trends to physiology departments, the text string "physiol" was used as a filter to extract data from the publicly available award data from NIH (3). Within this filtered dataset, there were more than 100 variations in the department name that were reported on the NIH Extramural Awards by State and Foreign Site website in the time period of 1992-2005. These departments were affiliated with a variety of Schools and specialized units (Table 1), although departments in Schools of Medicine received 89.4±1.8% of awarded dollars per fiscal year.

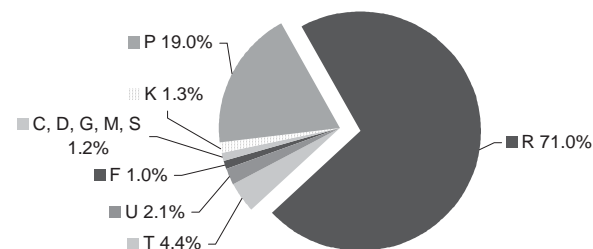


Figure 1. NIH support to investigators in physiology departments is mainly in research project awards (1992-2005).

Table 1: Percentage by School of NIH Dollars Awarded to Investigators in Physiology Departments Per Fiscal Year from 1992-2005.

| School | Mean ± Standard Deviation |
|--------------------------------------|---------------------------|
| Allied Health Professions | 0.00% ± 0.01% |
| Arts and Sciences | 3.51% ± 1.20% |
| Biomedical & Colleges of Engineering | 0.13% ± 0.25% |
| Dentistry | 0.36% ± 0.34% |
| Earth Sciences | 0.15% ± 0.12% |
| Education | 0.00% ± 0.01% |
| Graduate Schools | 0.94% ± 0.37% |
| Home Economics/Human Ecology | 0.20% ± 0.22% |
| Medicine | 89.47% ± 1.81% |
| Nursing | 0.87% ± 0.50% |
| Optometry | 0.50% ± 0.08% |
| Osteopathy | 0.38% ± 0.14% |
| Other Specialized Schools | 0.02% ± 0.03% |
| Pharmacy | 0.01% ± 0.02% |
| Primate Centers | 0.00% ± 0.01% |
| Public Health | 0.47% ± 0.57% |
| Veterinary Medicine | 2.95% ± 1.23% |
| No school affiliation | 0.06% ± 0.10% |
| Total | 100.00% |

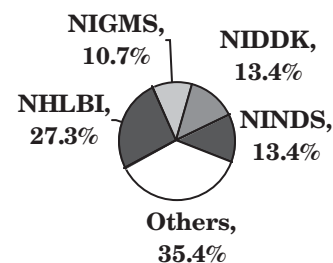


Figure 2. Approximately 65% of NIH funding is from four institutes.

research projects (R-series) per fiscal year during the period of 1992-2005, with ~85% of these being R01s (Figure 1). Support of research program projects and centers (P-series) comprised 19±1.0% of the total, with training programs (T-series), cooperative research awards (U-series), research career awards (K-series), fellowship programs (F-series) comprising 4.4±0.6%, 2.1±1.4%, 1.3±0.2%, and 1.0±0.3%, respectively, of the total. The remaining 1.2% was a combination of NIH support for research construction projects (C-series), training projects (D-series), resource programs (G-series), general clinical research center programs (M-series), and research-related programs (S-series). Although research and development-related contracts (N-series) were excluded from the analyses above, in the years that they were reported, they represented 0.6±0.4 of the total. This funding distribution by award type was remarkably consistent during the period examined.

Which institutes within NIH provide funding to investigators in physiology departments?

Approximately 65% of NIH dollars awarded per fiscal year to investigators in physiology departments originate in four Institutes: the National Heart, Lung, and Blood Institute (NHLBI): 27.3±1.0%; the National Institute of General Medical Sciences (NIGMS): 10.7±1.2%; the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK): 13.4±1.2%; and the National Institute of Neurological Disorders and Stroke (NINDS): 13.4±0.7% (Figure 2). The remaining 35% are from the other institutes, with none of these contributing on average more than 5% each. This funding pattern has also been remarkably constant

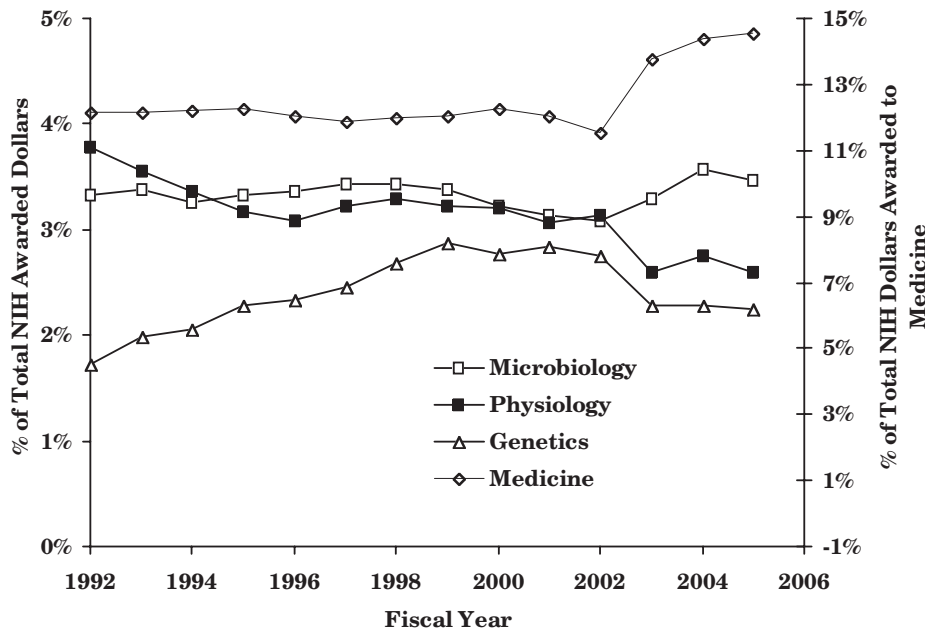


Figure 3. The percentage of NIH dollars awarded to investigators in physiology departments has decreased with time.

each fiscal year from 1992 to 2005.

Has NIH funding to investigators in physiology departments changed over time?

Table 2: Approximately 35% of NIH Funding Awarded to Investigators in Physiology Departments During 1992-2005 Was Distributed to 20 Institutions.

| Institution | Total Funding |
|---|-----------------|
| Vanderbilt University | \$188,635,820 |
| University of Pennsylvania | 175,723,214 |
| University of California San Francisco | 147,437,123 |
| Wake Forest University Health Sciences | 144,918,035 |
| Medical College of Wisconsin | 144,770,412 |
| University of California Los Angeles | 121,679,942 |
| Yale University | 119,510,045 |
| Northwestern University | 114,902,124 |
| Washington University | 113,971,808 |
| University of Washington | 109,559,501 |
| Case Western Reserve University | 107,656,775 |
| University of Virginia Charlottesville | 105,424,185 |
| University of Wisconsin Madison | 97,490,515 |
| Yeshiva University | 86,621,184 |
| University of Alabama At Birmingham | 86,100,755 |
| University of Michigan at Ann Arbor | 86,041,810 |
| Pennsylvania State Univ Hershey Med Ctr | 78,228,159 |
| University of Maryland Balt Prof School | 78,188,208 |
| Dartmouth College | 76,022,618 |
| Johns Hopkins University | 72,576,325 |
| Total Funding to Top 20 Institutions | \$1,910,573,963 |
| Total Funding to All Institutions | 5,470,126,250 |

To assess the impact of the NIH doubling on investigators in physiology departments, we calculated extramural support to physiology investigators as a percent of total NIH extramural support

excluding contracts. This market share analysis demonstrates that NIH funding to physiology departments decreased as a percentage of total funding since 1992 (Figure 3). The impact of a modestly growing NIH budget is already being seen in physiology as a constant level of awarded dollars and as a loss in market share. The impact of a flat or decreasing NIH budget is projected to have a more dramatic and negative impact.

in genetics departments increased annually during fiscal years 1992-1999, and remained constant until 2002. However, this was not sustained. Microbiology departments received a relatively constant percentage of NIH extramural dollars during 1992-2002. This flat market share resulted in an increase in awarded NIH dollars that parallels the growth of total extramural support from NIH (Figure 4B). During 2003 to 2005, years when total NIH extramural support only modestly increased, both microbiology and medicine departments received an increase in extramural funding (Figures 4B and C). This is reflected in Figure 3 as an increase in market share and is most likely the result of extramural awards related to biodefense. In contrast, while NIH dollars awarded to investigators in physiology and genetics departments increased during the NIH doubling, the level of funding to these departments has remained relatively constant during 2003-2005 (Figure 4A&B). This recent flat level of funding to physiology and genetics departments on a modestly growing total extramural base is represented as a decreased market share in Figure 3. The President of the Association of American Universities has stated that “continuing flat budgets at the National Institutes of Health (NIH) have already begun to undo the doubling of NIH funding” (7). The impact of a modestly growing NIH budget is already being seen in physiology as a constant level of awarded dollars and as a loss in market share. The impact of a flat or decreasing NIH budget is projected to have a more dramatic and negative impact.

Why didn't NIH funds awarded to physiology departments double during the NIH doubling period?

One obvious explanation for the decreasing market share is that the number of funded investigators in physiology departments could have decreased over time, or remained flat. To assess this, the total number of funded investigators in physiology departments, as well as those with one or more R-series awards, was measured from 1997 to 2005. As seen in Figure 5, the number of NIH-funded and the R-series subset of investigators in all physiology departments has remained constant during the period of the NIH doubling and beyond. This is also consistent with an unchanged total number of faculty in physiology departments from

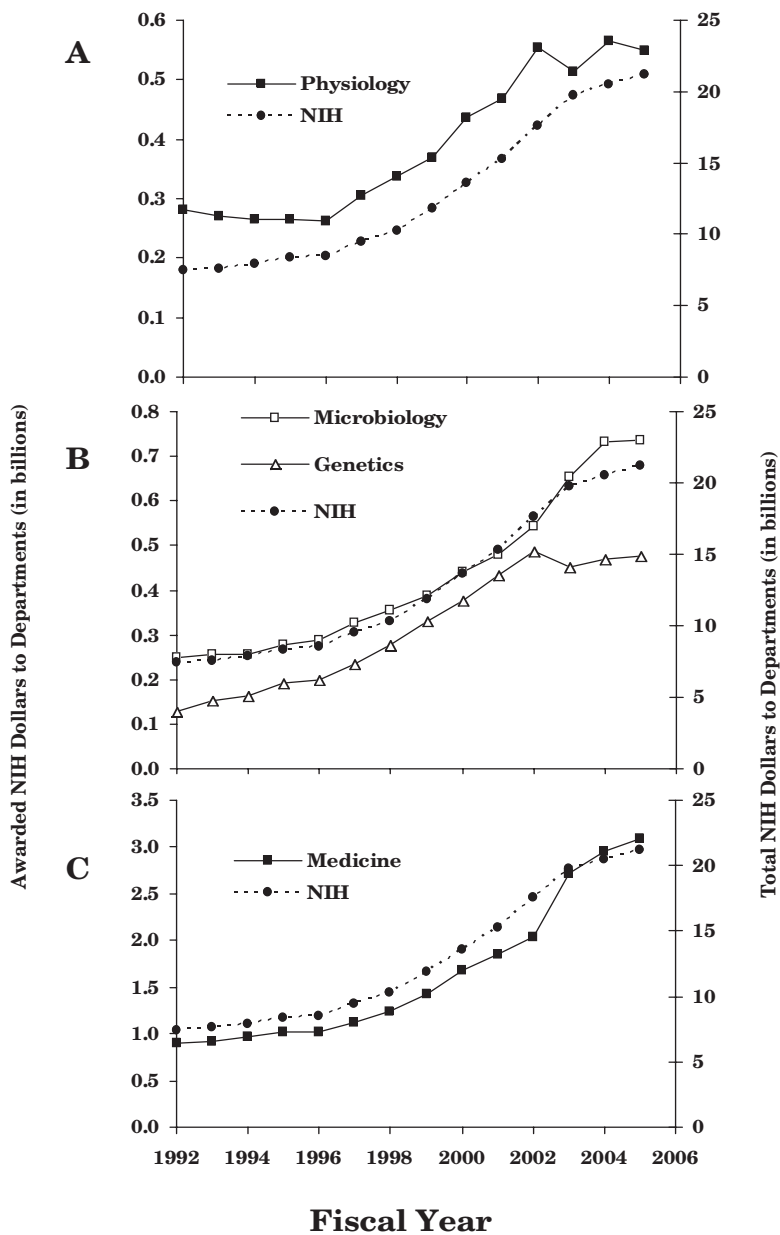


Figure 4. Physiology funding does not reflect the recent growth in the NIH budget.

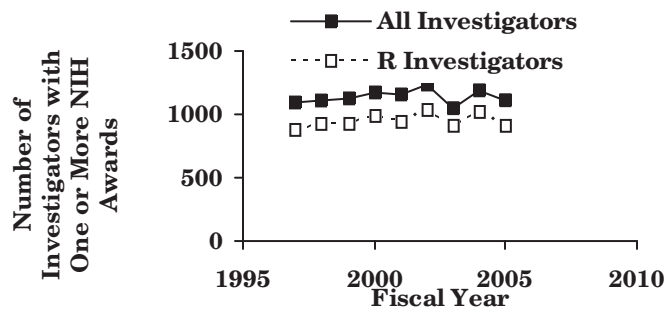


Figure 5. The number of NIH-funded investigators in physiology departments has not changed.

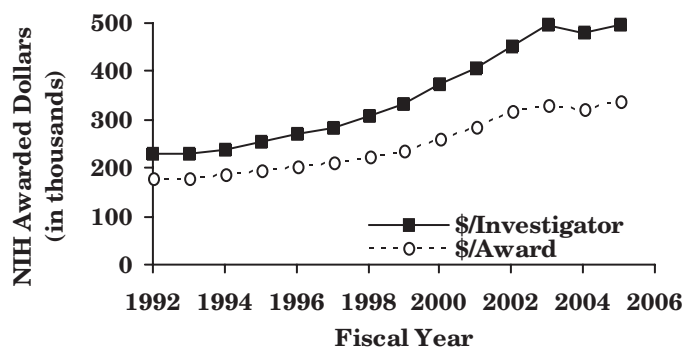


Figure 6. The average NIH dollars awarded per investigator and the size of awards have increased with time but are now flat.

2000-2004. These data were obtained from the yearly surveys done by The Association of Chairs of Departments of Physiology and The American Physiological Society (8).

Although the number of investigators in physiology departments has remained constant, the average dollars per NIH award, as well as the average NIH dollars awarded per investigator, has increased since 1992. In addition, the number of NIH awards received per investigator has increased from a mean of 1.31 in 1992 to a mean of 1.48 in 2005, representing a 13% increase. Each of these variables contributes to the increase in NIH dollars awarded to investigators in physiology departments during 1992-2005.

We next sought to determine how NIH funding was distributed to universities. NIH extramural awards, excluding contracts, for investigators in physiology departments was summed over the period from 1992-2005. Approximately one third of the total funding was distributed to ten percent of the universities.

When one examines the number of faculty in representative physiology departments in Schools of Medicine (9) from the highly funded institutions listed in Table 2, two trends are clear. First, the faculty size in these individual departments is larger than that of the mean for all physiology departments in Schools of Medicine (Figure 7). Second, an increase in faculty size of three of the four departments examined was observed, whereas the average department size remained constant. The School of Medicine faculty data are consistent with data for physiology departments independent of school reported by The Association of Chairs of Departments of Physiology (8). We recognize that this analysis of physiology departments in Schools of Medicine is not a perfect correlate to the analysis of

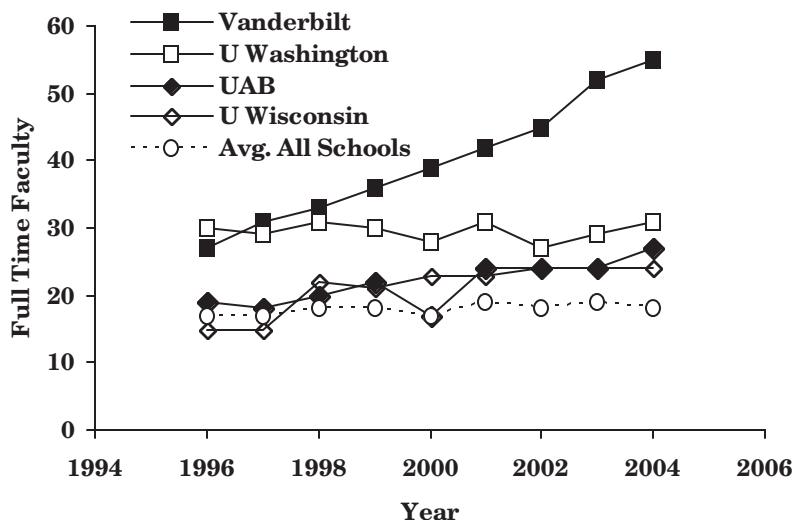


Figure 7. While the average faculty size has remained constant with time, several departments are large and growing.

NIH funding provided above, but because 90% of NIH dollars awarded to investigators in physiology departments are in Schools of Medicine, we reasoned that this was a meaningful surrogate for all physiology departments.

Summary. The NIH has generously supported biomedical research in physiology during the last decade, particularly through the research project mechanism. However, we are concerned that the tough choices reflected in the proposed 2007 budget (1) will have an immediate and long-lasting impact on the physiology community. In the last three years (2004-2006), total extramural NIH funding has not kept up with inflation, thus decreasing the “purchasing power” of NIH for biomedical research (10). We echo the apprehension expressed by FASEB (2) that diminishing relative support for biomedical research may discourage physiologists of the future from entering this profession and may slow the pace of discovery for those currently engaged in physiological research. It is only through active lobbying by physiologists and other scientists that this downward spiral in funding can be stopped.

References and Methods

1. National Institutes of Health, Summary of the FY 2007 President’s Budget, February 6, 2006 (<http://officeof-budget.od.nih.gov/pdf/Press%20info%20final.pdf>).

2. FASEB News, February 6, 2006 (http://opa.faseb.org/pdf/Presidents_budget2.6.06.pdf).

3. Detailed NIH award information from 1992-2005 is provided on the publicly available NIH Extramural Awards by State and Foreign Site website (<http://grants2.nih.gov/grants/award/state/state.htm>). From 1992-2002, award data for each year were compiled into a single word document, white spaces were replaced with tabs, and the file saved in text format. From 2003-2005, the data are available in text format. The 2005 data are preliminary and were as of 12/18/2005. Each text file was then delimited by tab, and row elements were manually aligned. Following alignment, the NIH award number was separated into data fields that represented the award code, the award type, the NIH funding institute, the award serial number, the year of the grant, and the supplemental or revision status. Data were then saved as Microsoft Excel files and imported into a Microsoft Access database. In order to assess the accuracy of the constructed database, total NIH extramural funding was determined by summing individual award amounts per year and compared to the NIH total reported on <http://grants2.nih.gov/grants/award/trends/icfund9803.html> from 1998-2003. There was strong agreement between the database and the reported data with less than 3% difference in any individual year. Because

contract information was not available for either 2002 or 2005, contracts were excluded from the analyses. NIH awards to Physiology Departments were extracted from the database by filtering the department name with the text string “physiol.” The filtered dataset was then exported to Microsoft Excel and the pivot table function was used for analysis.

4. NIH awards to investigators in departments of genetics were extracted from the database by filtering the department name using the text string “genetic.”

5. NIH awards to investigators in departments of microbiology were extracted from the database by filtering the department name using the text string “micro.”

6. NIH awards to investigators in departments of medicine were extracted from the database by filtering the department name using the text string “medicine.” These data were further filtered using a school name of “Medicine, Medicine & Dentistry, or Overall Medicine” and a department name of “Internal Medicine, Internal Medicine/Medicine or Medicine.”

7. Statement by AAU President Nils Hasselmo on President Bush’s FY07 Budget, February 6, 2006 (<http://www.aau.edu/budget/07Statement.pdf>).

8. Personal communication, Melinda Lowy, The Association of Chairs of Departments of Physiology and The American Physiological Society.

9. Faculty counts are from the Liaison Committee on Medical Education (LCME) Medical School Questionnaire Part II as reported in the AAMC Medical School Profile System.

10. Emily Singer, “Biomedical Funding in Crisis”, Technology Review, January 6, 2006 (http://www.technologyreview.com/BioTech-Therapeutics/wtr_16208,259.pl.html).

Acknowledgements

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FY 2007 Budget Outlook

On February 6, 2006, the President submitted his budget to Congress for fiscal year (FY) 2007. Included in the proposed spending plan is funding for the National Institutes of Health (NIH), the National Science Foundation (NSF), medical research at the VA, and human systems research at NASA. This year the administration chose to focus on the physical sciences, and provided substantial increases for research at the NSF, the Office of Science at the Department of Energy, and the National Institute of Standards and Technology. In contrast, biomedical research at the NIH, VA and NASA did not fare as well. The dismal funding situation in part reflects broad economic influences that have stressed the federal budget, including the war in Iraq and the cost of Gulf Coast restoration. Also affecting the budget situation is an attitude in Washington that biomedical research was "taken care of" with the doubling of the NIH budget, and it is now time to focus on the physical sciences. The President's proposed spending plan now goes to Congress, where funding levels are reexamined and subject to change. See below for details on each agency's budget.

NIH

Following last year's budget cut (the first since 1970), the administration's spending plan would hold NIH funding flat at \$28.6 billion in FY 2007. If Congress approves these levels, this would be the fourth year in a row where the NIH increase will fail to keep pace with the Biomedical Research and Development Price Index (3.8% for FY 2007). While the overall budget is being held flat, most institutes will receive small cuts to their budgets (<1%). For example, the National Heart, Lung, and Blood Institute's budget will decline by \$21 million, a decrease of 0.7%. These declines counterbalance modest increases in the budgets of the National Institute of Allergy and Infectious Disease, which will receive \$12 million over last year (0.3% increase), and the Office of the Director (OD), which is expected to receive an additional \$140 million, for a total of \$668 million. Under the proposed spending plan, funding for biodefense countermeasures in the OD would rise by \$110 million, accounting for much of the increase.

The budget for research project grants (RPGs) will decrease by \$230 million,

with an overall loss of 642 grants. Nevertheless, the number of new competing grants is expected to increase by 275 over last year. Declining numbers of non-competing grants account for the overall drop in awards.

In this tough budget environment, NIH has placed a priority on programs for new investigators, and this year will devote \$15 million to the new Pathways to Independence program. The new K99/R00 grant mechanism will support senior postdoctoral fellows as they transition to faculty positions and are able to apply for traditional R01s.

The NIH Roadmap for Biomedical Research will be increased by \$113 million, for a total of \$443 million. The OD will provide \$111 million from the Director's discretionary fund, and the other \$332 million will come from the institute and center budgets (representing approximately 1.2% of each IC's budget).

The APS, FASEB and other advocacy organizations are recommending a 5% increase over FY 2006 funding, which would allow the budget to keep pace with inflation, as well as allow NIH to take advantage of existing scientific opportunities.

NASA

The budget request for NASA in FY 2007 is \$16.8 billion, a 3.2% increase from the FY 2006 budget (excluding emergency money for Hurricane Katrina recovery). Despite the overall increase for the agency and a renewed focus on manned space flight, funding for the Human Systems Research and Technology theme will be decreased by 56%, down to \$274.6 million. This follows a cut of 19.7% in FY 2006, and is counter to FASEB's recommendation that NASA restore funding for basic life sciences and human countermeasures research.

VA medical and prosthetic research

The administration's proposed budget for VA medical and prosthetic research is \$399 million in FY 2007, a \$13 million decrease from last year. The VA predicts this will result in the loss of approximately 66 research projects, and the agency has outlined plans to refocus resources on acute and traumatic injury, mental illness, substance abuse, and central nervous system injury. The FASEB recommendation for VA medical and prosthetic research is \$460 million to allow the agency's budget to keep

pace with inflation and engage in research that is critical to the health care of returning veterans.

NSF

As part of the administration's focus on the physical sciences this year, the NSF's proposed budget includes a 7.9% increase to \$6.02 billion as the first installment in a ten-year plan to double the agency's budget. Under the proposed spending plan, the Directorate for Biological Sciences will receive an increase of 5.4%, to bring its total budget to \$607.85 million.

Despite the significant increases proposed for the agency, supporters point out that the request still falls short of the level authorized by Congress under a 2002 plan to double the budget. Some in Congress are also raising concerns about plans to reorganize NSF's highly successful education initiatives and in particular the lack of support for K-12 programs.

For FY 2007, FASEB called for \$6.4 billion for the NSF. While the proposed \$6.02 billion falls short of that level, this is a clear victory for the agency.

2006 Summer Short Courses in Integrative and Organ Systems Pharmacology

For the second year in a row, four academic institutions will offer summer short courses in Integrative and Organ Systems Pharmacology. Michigan State University, the University of California, San Diego, the University of Nebraska Medical Center and the University of North Carolina at Chapel Hill will each offer unique training experiences that will include the use of intact organ systems and *in vivo* models to illustrate the principles of pharmacology. Studies of this kind are critical in bridging the understanding between what goes on at the molecular level, and what goes on in the organism as a whole. Studying physiological changes that result from drug treatment and other causes will be of critical importance in developing safe and effective new disease treatments. With funding provided by the National Institute of General Medical Sciences, these programs are open to students at the graduate, postdoctoral and faculty levels from academia, industry and the

government. For more details on the individual courses including 2006 dates, go to: <http://www.nigms.nih.gov/Training/IOSP.htm>.

APS Publishes *Resource Book for the Design of Animal Exercise Protocols*

On February 7, 2006, the American Physiological Society (APS) published a *Resource Book for the Design of Animal Exercise Protocols*. This book was developed during series of meetings in 2003 and 2004 involving experts in the fields of exercise physiology and animal research models. It is intended for researchers, Institutional Animal Care and Use Committees (IACUCs), and those involved with research oversight. The authoring committee, which was comprised of exercise physiologists and laboratory animal veterinarians, reviewed reference material and drew upon their own experience to compile suggestions about how to design, review, and implement experimental paradigms involving animals and exercise. The APS

Resource Book was peer reviewed by other exercise physiologists and laboratory animal veterinarians. The PDF of the book is available online at <http://www.the-aps.org/pa/action/exercise/book.pdf>.

The opening chapter of the *Resource Book* outlines the scope of the document and addresses the relevance of studying exercise in general as well as the specific question, why study exercise in animals? It explains how the suggestions about the use of animals in exercise paradigms contained in the APS *Resource Book* fit into the context of US animal welfare requirements, including the Animal Welfare Act, the Public Health Service Policy on Humane Care and Use of Animals, and the ILAR *Guide for the Care and Use of Laboratory Animals*. Specifically, the APS *Resource Book* is intended to promote an informed dialogue that can help researchers and their IACUCs arrive at satisfactory answers to questions about how to assure the welfare of animals in exercise research protocols. To this end, the APS *Resource Book* includes 399 reference citations.

Topics addressed in the APS *Resource Book* include general concerns such as

selecting appropriate animal models for exercise research, study design considerations, animal stress, working with compromised animals, and the impact of surgery on exercise. A separate chapter covers common exercise protocols using rats and mice because these are currently the species used most frequently in exercise studies. Another chapter considers exercise protocols using large animals such as horses, pigs, and dogs. A third chapter discusses exercise protocols involving species such as rabbits, hamsters, guinea pigs, cats, goats, sheep, nonhuman primates, birds, and fish. In addition to an extensive list of citations, the book also includes appendices on hind limb suspension and immobilization of rats and mice and a set of sample animal exercise protocol scenarios for IACUCs and principal investigators.

NIH's Office of Laboratory Animal Welfare (OLAW) sponsored the development of the APS *Resource Book*. Single copies are available free of charge from OLAW while supplies last. Contact OLAW@od.nih.gov to request a free copy. Copies may also be purchased from the APS Store (<http://www.the-aps.org/store/>) for \$9.50 each. ❖

Positions Available

Postdoctoral Positions

Postdoctoral Position, Evolutionary Physiology, College of William and Mary. A postdoctoral position will be available beginning August of 2006, renewable through May 2009, to investigate the evolution of complex neuroendocrine pathways. Applicants should have a PhD prior to May 2006 and experience in one or more of these areas: physiological ecology, neuroendocrinology, behavior, evolutionary biology, physiology, or cell and molecular biology. The research focus is on the contribution of genetic variation and phenotypic plasticity to the evolution of the photoneuroendocrine pathway in mammals. This pathway integrates photoperiod and other environmental information to regulate reproductive, physiological and behavioral responses to seasons. The model system is a wild-derived laboratory colony of white-footed mice

(*Peromyscus leucopus*). The successful candidate will conduct collaborative research, supervise undergraduate students in the research laboratory, and teach a one semester course in animal physiology during the spring. More details on the research are available at: <http://faculty.wm.edu/pdheid>. The College of William and Mary is a "Public Ivy" with 5,500 undergraduate enrollment, an excellent undergraduate program, and a strong research tradition. Starting salary is \$35,000 plus benefits. Please send curriculum vita, a brief description of research interests/experience, and the names and contact information of three references to: Dr. Paul Heideman, Chair, Department of Biology, PO Box 8795, College of William and Mary, Williamsburg, VA 23187-8795; Email: pdheid@wm.edu. Review of applications begins March 1st and continues until the position is filled. [AA/EOE]

Postdoctoral Researcher: Field of Learning & Memory. A position is open for a postdoctoral research associate to carry out studies on the cellular basis of learning and memory using the medicinal leech as a model system. The position primarily involves carrying out electrophysiological (whole cell voltage and current clamp) experiments; however, molecular projects (PCR, RNAi) are underway as well. Projects include examining 5HT modulation of neuronal excitability and NMDA-dependent and -independent forms of LTP and LTD. The laboratory currently has funding from the NSF and NIH, the latter through a Center of Biomedical Research Excellence (COBRE) grant. Salary will be based and NIH guidelines and full healthcare benefits will be provided. Funding at this time is for up to two years for this position. For more information contact: Brian Burrell, Neuroscience Group, Division of Basic Biomedical Sciences, University of South Dakota School of Medicine,

Vermillion, SD 57069; Tel.: 605-677-3182; Email: bburrell@usd.edu; web: <http://www.usd.edu/biomed/biomedfaculty/burrell/> or <http://www.usd.edu/neurogroup/>. [AA/EOE]

Postdoctoral Position: Effects of exercise on asthma: A postdoctoral position is available to study the effects of aerobic exercise on asthma-related responses, including lung inflammation, T cell function, and airway hyperreactivity. Systems utilized in these studies include transgenic animal models, mechanical ventilation, primary cell culture, biochemical techniques, and confocal microscopy. Highly motivated applicants with research experience in Physiology, Immunology, Cell Biology, or a related field are encouraged to apply. Two years of funding are available with possibility of renewal upon mutual agreement. Salary and benefits will be commensurate with experience and in accordance with NIH guidelines. Interested individuals should send a curriculum vitae and the names and addresses of three references to Lisa M. Schwiebert PhD, Department of Physiology and Biophysics, University of Alabama at Birmingham, MCLM 955, 1918 University Boulevard, Birmingham, AL, USA; Email: lschwieb@uab.edu.

Postdoctoral Position: An NIH-funded position is immediately available to study the regulation of voltage gated K^+ channels in vascular smooth muscle. A variety of experimental approaches are employed in these studies including mechanical studies of isolated, pressurized small mesenteric arteries; electrophysiology of K_v channels in native smooth muscle myocytes and heterologously expressed in mammalian cells; analysis of gene and protein expression; analysis of promoter function; and immunolocalization of K_v proteins. Salary is based upon experience and current NIH salary levels. Applicants must have a MS degree or higher and experience in one or more of the above areas. Interested applicants should send a cover letter, curriculum vitae, and names of three references to: Robert H. Cox, PhD, Ion Channel Laboratory, Lankeanu Institute for Medical Research, 100 E. Lancaster Avenue, Wynnewood, PA 19096; Email: coxr@mlhs.org; Home Page: <http://www.limr.org>.

Postdoctoral Position In Neuroendocrinology: Nestlé Research Center (NRC) located near Lausanne, Switzerland is one of the leading research laboratories in food and nutritional sciences. With 700 members of staff from 50 nations, NRC has a strong position in the international scientific community supported further by 262 outside scientific contracts and 270 scientific publications/year. NRC has an excellent reputation in food and nutrition research that has benefited consumers for over a century. By bringing together its knowledge in nutrition and health, food science, food/consumer interaction, food quality and safety, Nestlé opens the way to develop good food and good life: to offer tasty foods that procure health as well as pleasure for our consumers. In this global and multicultural environment, Nestlé, a food, nutrition, health and wellness company aims to work with the best scientists in the world. To impact on behavior and wellness perception, we need to learn how to impact on the gastro-intestinal neuro-endocrine pathways by nutritional means. The NRC is seeking a Postdoc who will receive as main responsibilities: the postdoc will be assigned to a project dealing with the modulation of gastrointestinal peptide signalling by nutrition and their impact on behaviour managed by a senior scientist of the Digestive Health group. The postdoc will contribute to: selection (from literature and internal data) of bioactive molecules able to modulate gut peptides and/or to interact with receptors (CCK, opioids, motilin); screening assays to confirm ligand-receptor binding; establishment of appropriate methods to liberate bioactive molecules in the gastrointestinal tract; evaluation of bioavailability of selected molecules in animal models; animal experiments measuring the impact of selected nutrients on behaviour (crying, sleep). Key performance metrics: knowledge of the literature and internal data available within one to two months; integration within digestive health; development of contacts with BAS, FS and FCI departments; establish link with the protein-peptide pipeline team; innovative suggestions for future research within the two years. Expected competencies: training in neuroendocrinology or psychoneuroendocrinology; trained in animal experimentation (behavioural tests, tissue analysis); experience in methods of neurobiology (protein/peptide analyses, pep-

tide-receptor interactions, gene expression, immunohistochemistry, etc.); knowledge on gut peptides and receptors; fluent English, French basis would be a plus. All applicants will have to apply directly on our website dedicated to recruitment (no email or paper applications) <http://www.careers.nestle.com>.

Research Positions

Senior Level Scientist: The University of Virginia is seeking a senior-level PhD with experience at the assistant professor level who has extensive experience with assays for S-nitrosothiols, including S-nitrosothiols. The investigator must have current, independent grant funding and at least four years' experience in the field of S-nitrosothiol biology and protein chemistry. She/he must have experience performing cell culture techniques, HPLC, immunoprecipitation, immunoblotting, protein isolation, northern blotting, PCR, siRNA experiments, and electrophoresis shift assays for gene regulatory proteins; additionally, familiarity with proteomics techniques is required. She/he must have a proven track record of publications regarding S-nitrosothiol signaling on which she/he is first or corresponding author. Interviews for this position start immediately and continue until the position is filled. To apply a letter of interest and CV should be submitted, preferably by email to: Benjamin Gaston, MD, Ivy Foundation Professor of Pediatrics, University of Virginia Pediatrics, PO Box 800386, Charlottesville, VA 22908; Tel.: 434-924-1820; Email: bmg3g@virginia.edu. [AA/EOE]

Cardiovascular Scientist: Department of Pharmacology, Physiology & Toxicology. Applications are invited at the Assistant or Associate Professor level for a tenure-track faculty position in the Department of Pharmacology, Physiology & Toxicology. Applicants should conduct research on molecular or genetic basis of cardiovascular disease and should currently have a nationally funded research program in this area. The successful candidate will participate in the activities of the Department and will contribute expertise to the West-Virginia IDEa Network of

Biomedical Research Excellence (WV-INBRE) program. WV-INBRE is an NIH-funded multi-institutional program with a research theme in cellular and molecular biology and a focus on cardiovascular disease. Applicants should send a curriculum vitae, statement of research interests and funding source(s), the names and contact information for at least three references to: Chair of the Search Committee, Dr. Gary O. Rankin, Department of Pharmacology, Physiology & Toxicology, Joan C. Edwards School of Medicine, Marshall University, 1542 Spring Valley Drive, Huntington, WV 25704-9310; Email: rankin@marshall.edu, Fax: 304-696-7391. Applications will be accepted until the position is filled. [AA/EOE]

Assistant or Associate Research Professor: Department of Cellular & Integrative Physiology, Indiana University School of Medicine. A non-tenure track research faculty position (Assistant or Associate Research Professor) is available to investigate mechanisms of cardiovascular disease in diabetes. Experience in several aspects of tissue, cellular, and molecular studies on vascular tissues from animal models of vascular disease and diabetes are required, including: in vitro vascular function, immunoblot protein assay, RT-PCR, patch clamp electrophysiology, fluorescence microscopy, and intracellular calcium imaging. Experience in canine and porcine models of diabetes is highly desirable. Experience is required in supervision of laboratory technicians, graduate students, and undergraduate students. A PhD in physiological sciences, three years postdoctoral experience in animal models of vascular disease and membrane biology, at least one year experience as an independent scientist, and future plans for independent diabetes research as evident by grant applications are required. Co-supervision of a large laboratory will be a major responsibility. Opportunity for teaching experience, extensive collaborations, and independent laboratory resources will be provided. The individual will be expected to obtain extramural research support to transition to a career as an independent investigator. Applicants should send (in electronic format) their curriculum vitae, brief statement of research interests and goals, and the names of three referees to Dr. Michael Sturek, Chair, Department of Cellular &

Integrative Physiology, c/o Marlene Brown (pbio@iupui.edu), 635 Barnhill Drive, MS 385, Indianapolis, IN 46202-5120. [EEO/AA, M/F/D]

Research Analyst: Full-time position for Research Analyst in Indianapolis, Indiana. Responsibilities include designing and performing a wide range of experiments to determine the effects of exercise training and pharmacological therapy on coronary artery disease in specialized breeds of miniature pigs. Conduct lipid assays, intravenous glucose tolerance test, insulin sensitivity test, echocardiograms and electrocardiograms to determine cardiac function, and angiography and intravascular ultrasound procedures to quantify atherosclerosis. Requires Masters of Science degree in Physiology and thesis work in swine Cardiovascular Physiology. Please send resume to Tracy McWilliams, Indiana University School of Medicine, Department of Cellular & Integrative physiology, 635 Barnhill Dr. MS 387, Indianapolis, IN 46202. [EEO/AA, M/F/D]

A Multidisciplinary Approach To Vascular Biology. The University of Virginia offers an outstanding, multidisciplinary training program, with broad opportunities in cutting-edge cardiovascular research and an emphasis on vascular biology. Fourty-two faculty members share in the creation of a rich research environment and in mentoring for both postdoctoral fellows and graduate students. Focus areas for our research: smooth muscle and endothelial cell signal transduction, cell-matrix interactions, vascular development (cell differentiation and angiogenesis), stem cells-tissue engineering, and cell-cell communication. Our combined laboratories offer a wealth of technical capabilities including: gene array, multi-modality microscopy (confocal, multi-photon, atomic force), NMR spectroscopy, small mammal cardiovascular MRI, physiological genomics, and computational biology. Training includes course work, seminars and journal clubs, and informal social gatherings with faculty and other trainees. Trainees participate actively in the training by organizing the journal club, and by hosting an annual trainee visiting seminar speaker. Opportunities for teaching are offered in the trainee-run colloquium "Topics In

Cardiovascular Research." The training program is supported by an NIH training grant, which provides stipends, tuition, travel funds, and health insurance as well as tuition for special interest courses off campus. Pre-doctoral trainees can enroll in any of seven different degree-granting programs and training usually requires 5-6 years. We also offer a unique opportunity for MD's who wish to obtain the PhD degree in an accelerated program. The breadth of interests of the faculty members as well as the local environment can be explored at our web site at <http://www.healthsystem.virginia.edu/internet/CVRC/Training/TGtraining.cfm>. If you are interested in applying, please contact Ms. Sarah Ponzi (cvrctg@virginia.edu), or Dr. Brian R. Duling (brd@virginia.edu). You may also apply directly via our web site. Please note that we are an Equal Opportunity Employer, and that these positions are restricted to US citizens or to permanent resident. Admission: Graduate School please go to: <http://www.healthsystem.virginia.edu/internet/bims/home.cfm>. Postdoctoral fellowships go to: <http://www.healthsystem.virginia.edu/internet/CVRC/Training/MENTORFRONTPAGE.CFM>. You may apply either to a particular faculty member or to Dr. Brian R. Duling, Robert M. Berne Professor of Cardiovascular Research, Member, Cardiovascular Research Center, Department of Molecular Physiology and Biological Physics, 409 Lane Rd., MR-4 Building, Room 6051, University of Virginia School of Medicine, Charlottesville, VA 22908 USA; Email: brd@virginia.edu; Tel.: 434-924-9040; Fax: 434-924-2828.

Research Physiologist: US Army Research Institute of Environmental Medicine, Natick, Massachusetts. The Thermal and Mountain Medicine Division of the US Army Research Institute of Environmental Medicine invites applications for a Research Physiologist position. This is a temporary, which could lead to tenure-track (permanent), civilian position; \$45,000 to \$86,000 depending on qualifications. The successful candidate will develop an independent research program in Environmental Pathophysiology to examine mechanisms of heat/cold injury using animal/molecular models. Applicants need a strong background in integrative/systems physiology; bio-

chemistry, molecular biology, surgical skills and experience with rodent models. Knowledge of thermoregulation and exercise physiology is desirable. Applicants must be US citizens, must have a PhD in Physiology / Biochemistry or a related field, postdoctoral experience and a strong record of publications. Women and minorities are encouraged to apply. Contact: Dr. Lisa R. Leon, US Army Research Institute of Environmental Medicine, Kansas Street, Natick, MA 01760-5007; Tel.: 508-233-4862; Email: lisa.leon@na.amedd.army.mil.

Research Assistant: The University of Virginia, Department of Pharmacology is seeking applications for a Research Assistant to explore the structure of T-type calcium channels. Masters degree in Biochemistry is required with experience in protein purification, detergent solubilization, and yeast two hybrid screening, and antibody work. To apply send resume and references to: Dr. Edward Perez-Reyes, Department of Pharmacology, University of Virginia, PO Box 800735, Charlottesville, VA 22908-0735, Email: eperez@virginia.edu. (Open until filled). [AA/EOE].

Faculty Positions

Assistant/Associate/Full Professor: Basic Scientist Faculty Position: The national Osteopathic Research Center at UNT Health Science Center at Fort Worth, Texas is seeking outstanding applicants for a full time tenure-track faculty appointment at the Assistant, Associate or Full Professor level. Applicants must hold a PhD or equivalent doctoral degree, have a minimum of two years of postdoctoral experience (for applicants at the Assistant Professor level), and have established an independent currently funded research program. Research interests should relate to the principles of Osteopathic Manipulative Medicine (<http://www.aacom.org/om.html>) which include, but are not limited to, musculoskeletal biology, biomechanics, imaging, autonomic physiology, immune-physiology interactions, and somatovisceral interactions. The successful applicant will also be expected to participate in the development of new collaborations with clinical

faculty that lead to grant applications in these areas of research. The position will be 100% dedicated to research. Laboratory space and startup funding will be available. Initial rank and salary will be commensurate with the successful applicant's experience. Please apply online at <http://www.unthscjobs.com> and attach the following to your online application: a letter of application, curriculum vitae, statement of career objectives, and the names and addresses of at least three references. Any questions regarding this position may be directed to Michael L. Smith, PhD, Search Committee Chair, at msmith@hsc.unt.edu or 817-735-2451. The website for the Osteopathic Research Center is <http://www.hsc.unt.edu/orc>. [EEO/AA]

Assistant/Associate Professor: Albany Medical College invites applications for tenure-track faculty positions in the Center for Cardiovascular Sciences. We seek highly motivated individuals with a record of research productivity, grant funding, and a desire to participate in Graduate and Medical Education. The applicant's research should complement existing programs in the Center that include vascular smooth muscle and endothelial cell function and regulation, nitric oxide and reactive oxygen species biology, cardiovascular development, and heart failure. A PhD or MD/PhD degree and three years of productive postdoctoral experience are minimal requirements for appointment at the Assistant Professor level. Applicants for Associate Professor should have three to five years experience at the Assistant Professor level and a nationally recognized and funded research program. Investigators in the Center for Cardiovascular Sciences have exciting opportunities for collaboration with scientists at neighboring institutions including the Ordway Research Institute, Rensselaer Polytechnic Institute, and the New York State Wadsworth Laboratories. The Capital Region offers diverse cultural and recreational attractions with easy access to Boston, New York City, and the Adirondack, Catskill, and Berkshire Mountains. For further information about the Center and Albany Medical College, please visit <http://www.amc.edu>. Applicants should submit a current curriculum vitae, brief description of research interests and plans, and three letters of recommendation by March 1, 2006 to: Dr. Harold A. Singer, Director,

Center for Cardiovascular Sciences, Albany Medical College (MC-8), 47 New Scotland Avenue, Albany, NY 12208. [EOE/AA]

Professor and Chairperson: Texas Tech University Health Sciences Center School of Medicine invites applications for the position of Professor and Chairperson of the Department of Physiology. The School of Medicine, which is primarily based in Lubbock, TX, and has campuses in Amarillo, El Paso, and the Permian Basin, offers many outstanding professional and academic opportunities and is committed to expanding its research funding and infrastructure. A description of the Department of Physiology, its resources, faculty and their research interests can be found at <http://www.ttuhs.edu/som/physiology/>. A very competitive start-up package, including the opportunity to hire several new faculty, will be made available to the successful candidate. Chair candidates must possess a PhD and/or MD degree. The chair must be dedicated to directing, promoting, and developing the research and teaching missions of the department. Preferred candidates will have qualifications for appointment as a full professor. In addition, national and preferably international recognition in the field of Physiology is important. The chairperson must possess excellent interpersonal skills and leadership qualities. This position is open until filled, and evaluation of applications will begin immediately. Interested applicants should complete the online application process at website: <https://jobs.texasstate.edu> (requisition #60777), and should include a letter of application, CV, and the names of three references. All application materials will be directed to: Douglas Stocco, PhD, Chair, Search Committee for Chair of Physiology, Texas Tech University Health Sciences Center, 3601 4th Street, Stop 6540, Lubbock, TX 79430; Email: Doug.Stocco@ttuhsc.edu. [AA/EOE]

Department Chair: Natural & Physical Sciences, Park University. This is a tenure-track position at the Associate or Professor rank. Duties include serving as Chair of the newly created Department of Natural and Physical Sciences, a diverse department offering degrees in Biology, Chemistry, Physics, and Geology. The successful

candidate will have a PhD in the area of biology with the ability to teach Microbiology and/or Anatomy & Physiology. Other requirements include evidence of good teaching, and scholarly productivity. Administrative experience, experience in grant writing is highly desirable. This tenure-track position is contingent on funding and is scheduled to begin August 2006. Park University has an excellent benefits package including health, dental, and life insurance, retirement plan, and tuition paid undergraduate classes for employees and dependents. All qualified applicants should submit a letter of application, a complete vita, and at least three letters of recommendation to: Park University, Director of Human Resources, Box 11, and 8700 NW River Park Drive, Parkville, MO 64152; email: Careers@park.edu. Please visit our website at <http://www.park.edu> for more employment opportunities. [EOE]

Clinical Faculty: Physiology, Pathophysiology. The UWM College of Nursing is seeking doctorally prepared clinical faculty for classroom and clinical instruction. Doctoral degree or equivalent in physiology or pathophysiology required. Desired starting date is summer or fall 2006. This is a continuous recruitment. Screening of applications will begin February 15 and will continue until positions are filled. Electronically send letter of application, vita, and the names, titles, telephone numbers and addresses to: address questions to Dr. Kim Litwack, Recruitment Committee Chair, Email: litwack@uwm.edu; Tel.: 414-229-5098. <http://www.nursing.uwm.edu>. [AA/EOE]

Assistant Professor: NSERC University Faculty Award (UFA) in Biophysics: The Departments of Physics and Biology at the University of Waterloo are seeking to nominate a candidate for a Natural Sciences and

Engineering Research Council of Canada (NSERC) University Faculty Award (UFA) for the Fall 2006 competition. These awards are directed toward women and aboriginals in science and engineering. (See http://www.nserc.ca/guide/sf/3g_e.htm). A successful candidate will be appointed as a regular tenure-track faculty member at the Assistant Professor level jointly in both Departments, starting July 1, 2007. Applicants whose research lies broadly within the area of biophysics will be considered. Applicants must have a PhD degree and a proven research record, normally including postdoctoral experience. The chosen candidate is expected to develop an innovative, externally-funded research program as well as be committed to excellent teaching at both the undergraduate and graduate levels. We also encourage applicants who have had career delays associated with family responsibilities. Inquiries and applications should be directed to: Biology-Physics UFA Search, Robert Mann, Chair, Department of Physics, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1. Applicants should submit a complete curriculum vitae, a research proposal (one to two pages in length), a short statement of teaching interests and three letters of recommendation before May 1, 2006. In exceptional circumstances a second appointment may be possible. Additional information concerning the Departments of Biology and Physics can be found at <http://www.biology.uwaterloo.ca> and <http://www.physics.uwaterloo.ca>. In accordance with UFA requirements, this position is available only to Canadian citizens and permanent residents of Canada. Screening of applications will commence on May 1, 2006.

Instructor: The University of Mississippi Medical Center, Jackson, MS, has an opening for an Instructor. Will design experimental protocols and

conduct experiments related to cardiovascular physiology, analyze and interpret the data, submit for publication in peer-reviewed journals, and present results of experiments at national and international meetings. Proficiency in *in vivo* microcirculatory techniques such as spinotrapezius and cremaster muscle preparation, and molecular techniques (ELISA assays, Western blot analyses, etc.). Familiarity with grant submission process and ability to attract funding. MD or PhD required. Submit cover letter and curriculum vitae to: Ronnie Poole, Department of Human Resources, 2500 North State Street, Jackson, MS 39216-4505. [EOE, M/F/D/V]

Program Manager: Ethel Austin Martin Program in Human Nutrition, South Dakota State University. Assist in the management of large children's study by coordinating community needs assessment and community engagement activities; coordinate household screening schedules; supervise research assistants and research coordinators. Work with advisory councils, local hospitals and clinics to develop and oversee protocols and studies and ensure proper data collection. Earned Bachelor's Degree with experience in health related field, conducting human studies or Registered Nurse. Proficient with the internet and Microsoft Office (Word, Excel, and Access); effective communication and interpersonal skills; ability to pass IT security training and federal security clearance. Must be willing to be on 24-hou call for periodic data collection. Phlebotomy experience preferred. Travel within four-county region required. For full list of qualifications and information, visit: <http://jobs.sdstate.edu>. To apply, send letter of application, resume, transcripts, contact information for three professional references by January 20, 2006 to: Dr. Matt Vukovich, EA Martin Program, SEM 102/Box 2204, SDSU, Brookings, SD 57007. Phone: 605-688-4661. [AA/EEO]

Advertise your job vacancy to over 10,000 members and subscribers!

Ads are accepted for either positions available or positions wanted under all categories. The charge is only \$75. All ads are also posted on the APS Career Opportunity Web page upon receipt for a three month period.

If you would like to have your ad listed in *The Physiologist* or on the APS Career Opportunities Web page (<http://www.the-aps.org/careers/careers1/posavail>.

<http://www.the-aps.org/careers/careers1/posavail>), 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 Linda Dresser (Email: ldresser@the-aps.org; Tel: 301-634-7165; Fax: 301-634-7241).

APS Member, **Novera Herbert Spector** was recently inducted into the US Fencing Hall of Fame. Unbeknownst to many of his scientific colleagues, Herb had a double life, scientist by day time and Zorro at night, or on the weekend. Herb began fencing at City College in New York, serving as Co-Captain for the US Intercollegiate Sabre Championship team in 1941 and participating on six Olympic squads in saber and one in epee, although he never competed in the Olympics. Herb has qualified for the US National Championships for 60 years. During his induction into the US Fencing Hall of Fame, it was revealed that Herb's nickname among fencers is "Foxy Grandpa." APS congratulates Herb on his accomplishment!

Michael Stephen Beauchamp, an assistant Professor, has affiliated with the Department of Neurobiology and Anatomy, University of Texas Medical School, Houston. Beauchamp was formerly a Research Fellow, associated with the National Institutes of Health and the National Institute of Mental Health, Bethesda, MD.

Chun Mei Cao has joined The Institute of Molecular Medicine, Peking University, Beijing, China. Before her new position, Cao had been associated with the Department of Physiology, Zhejiang University School of Medicine, Hang Zhou, China.

Shaoyou Chu has accepted the position of Senior Research Scientist, Lilly Research Laboratories, Department Lead Optimization Biology/ Lead Generation Biology, Indianapolis, IN. Chu was formerly Assistant Professor, Department of Cell Biology/Genetics, University of North Texas Health Science Center, Fort Worth.

Abe DeAnda, Associate Professor, joined the Department of Cardiothoracic Surgery, Albert Einstein College of Medicine, Bronx, NY. DeAnda was previously affiliated with the Division of Cardiothoracic Surgery, Medical College of Virginia, Richmond.

Dariusz Elahi is currently a Professor with the Department of General Surgery, Johns Hopkins Bayview Medical Center, Baltimore, MD. Prior to his new position, Elahi was affiliated with the Department of General

Surgery, University of Massachusetts Medical School, Worcester.

James D. Fluckey, Assistant Professor, recently moved to the Department of Health and Kinesiology, Muscle Biology Laboratory, Texas A&M University, College Station. Formerly, Fluckey was affiliated with the Department of Geriatrics/Center on Aging, University of Arkansas Medical Science, Little Rock.

Xinbeng Han, a Research Fellow, has joined the Department of Vascular Medicine, Brigham & Women's Hospital, Cambridge, MA. Han was formerly associated with the Department of Neonatology, Children's Memorial Hospital, Chicago, IL.

Yi Jia has affiliated with the Department of Molecular Medical Branch, NIDDK, Bethesda, MD. Jia was previously associated with the Department of Basic Medical Science, Purdue University, West Lafayette, IN.

Ole Johan Kemi accepted the position of Lecturer, Institute of Biomedical and Life Sciences, University of Glasgow, United Kingdom. Kemi was previously with the Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway.

Robert Kenefick, an Assistant Professor, recently joined the US Army Institute of Environmental Research, Department of Thermal & Mountain Medical Division, Natick, MA. Prior to his new position, Kenefick was affiliated with the University of New Hampshire, Department of Kinesiology, Durham.

Robert John Kolb moved to the Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, as a Research Fellow. Formerly, Kolb was a Postdoctoral Fellow, Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH.

Dieter F. Kutz is currently an Assistant Professor, Department of Physiology, University of Munich, Muenchen, Germany. Kutz was previously associated with the University of Bologna, Department of Human and General Physiology, Bologna, IT.

Paul Milward Lea, IV, is the Director of Research Operations, New Health

Sciences Inc., Bethesda, MD. Lea was formerly a Research Instructor, Department of Neuroscience, Georgetown University, Washington, DC.

Lawrence J. Mandarino accepted the position of Director, Arizona State University Center for Metabolism Biology, Tempe. Mandarino was previously affiliated with the Department of Medicine, University of Texas Health Science Center, San Antonio.

David E. Millhorn is presently Vice President for Research, University of Tennessee, Department of Research, Knoxville. Prior to his new position, Millhorn was the Director, University Cincinnati Genome Research Institute, Cincinnati, OH.

Hui-Lin Pan, a Professor, has accepted a position with the Department of Anesthesiology and Pain Medical Unit 409, University of Texas-MD Anderson Cancer Center, Houston. Pan was formerly an Associate Professor, Department of Anesthesiology (H187), Penn State University College of Medicine, Hershey, PA.

Kyung Won Park has joined the Department of Anesthesia, Santa Clara Valley Medical Center, San Jose, CA, as an Associate Professor. Prior to his new position, Park was affiliated with the Department of Anesthesiology, Beth Israel Deaconess Medical Center, Boston, MA.

Christopher Graeme Sobey, a Senior Research Fellow, has moved to the Department of Pharmacology, Monash University, Clayton Victoria, Australia. Prior to his new affiliation, Sobey had been a Research Fellow, Department of Pharmacology, University of Melbourne, Parkville Victoria, Australia.

Winnie W.C. Shum is presently a Postdoctoral Fellow, Massachusetts General Hospital, Simches Research Center, Boston. Shum was previously affiliated with the Chinese University of Hong Kong Faculty of Medicine, Shatin, Hong Kong.

Jonathan David Tune, an Associate Professor, has affiliated with the Department of Cell and Integrative Physiology, Indiana University School of Medicine, Indianapolis. Previously, Tune, a Senior Fellow, was associated

with the Department of Physiology, Louisiana State University Health Sciences Center, New Orleans.

Jeffrey Scott Upperman is now Assistant Professor of Surgery, Department of Surgery, Children's Hospital, Los Angeles, CA. Before accepting his recent position, Upperman had been Assistant Professor, Department of Surgery, University of Pittsburgh, PA.

Darin Lee Van Gammeren recently affiliated with the Department of Health Sciences, Boston University, MA as a Research Assistant. Van Gammeren was previously associated with the Department of Exercise and Sport Sciences, University of Florida, Gainesville.

Wang Wang, a Postdoctoral Fellow, has affiliated with the Department of Molecular and Integrative Physiology, University of Michigan, Ann Arbor. Wang was previously associated with the National Institute of Aging, Laboratory of Cardiovascular Science, Baltimore, MD.

B. Stanley Willenbring, an Associate Professor, has joined the Department of Biology, Dabney Lancaster Community College, Clifton Forge, VA. Willenbring was formerly an Assistant Professor, Department of Science and Math, Jefferson College of Health Sciences, Roanoke, VA.

Timothy D. Wilson, an Assistant Professor, has affiliated with the University of Western Ontario, Faculty of Health Sciences, London, Ontario, Canada. Wilson was formerly a

Postdoctoral Student, University of Pittsburgh School of Medicine, Department of Otolaryngology, EEI, PA.

Stephen C. Wood has joined the Ross University School of Medicine, Portsmouth, Dominica, West Indies, as Professor of Physiology. Wood was previously associated with East Carolina University School of Medicine and North Eastern Ohio Universities College of Medicine, Department of Physiology, Rootstown, OH.

Christopher R. Woodman, an Assistant Professor, has affiliated with the Department of Health & Kinesiology, Texas A&M University, College Station. Woodman was previously a Research Assistant Professor, associated with the Department of Veterinary Biomedical Science, University of Missouri, Columbia. ♦

Senior Physiologists' News

Letter to Julio Cruz

Morris Rockstein writes: "Thank you for the birthday wishes and follow-up letter.

"As for my current activities, aside from contact with the APS, AAAS, and the Gerontological Society, through their publications and newsletters, having given up driving and living alone, hampered by limited mobility by osteoarthritis. I still manage to get up onto the dance floor about once a week for ballroom and Latin dancing (allowing my overriding cerebral input to hide the pain through the pleasure of the moment. Needless to say, tennis, frisbee, and surf fishing are only memories.

"It is interesting to mention that my daughter, in surfing the internet, found a considerable number of inclusions in Google of my work and activities, including a recent photo.

"Thank you for your continued interest in the doings of a fellow Physiologist. (Rocky to my friends)."

Letters to Beverly Bishop

Robert White writes: "Dr. Robert White

was very pleased to receive your notification for APS members who had reached their 80th birthday. He appreciates very much your congratulations.

"Professor White is still extremely active in writing and speaking in those areas of neuroscience that he researched for so many years, i.e., brain cooling, transplantation and mechanical support of the isolated brain. He travels considerably outside of the country attending various scientific meetings and, as a member of the Pontifical Academy of Sciences, each fall he travels to Rome for their annual meeting.

"You asked for words of wisdoms or advice for colleagues: Biological Science seems to be fixed on reducing life to its most simple elements. I would like to suggest that physiology can be reborn by working in system research and, in the process, begin to put the living organism back together again."

Walter Ehrlich writes: "I thank you for conveying to me the kind wishes of the American Physiological Society for my 90th birthday. At your suggestion, I will try to summarize how experiences from my life and research contributed to what I think, believe and do today.

"I studied medicine at the Charles University in Prague. In the fall of 1938, when Hitler invaded parts of Czechoslovakia, I left the country. In March 1939, Hitler invaded the rest of the Czech country. This so outraged the French public, that Czech refugees could now legally stay in France and I was able to work as a volunteer at the clinics of Professors Fiesinger and Mondor in Paris. In the afternoons and evenings I had to make a living, somehow.

"Then on the first of September of the same year, Hitler invaded Poland. WWII started and a Czechoslovak Army in Exile was created. I volunteered and was enrolled in an Infantry Battalion in the South of France. In 1940, when France was invaded from the unsecured North, this Battalion participated in its badly equipped defense. After the armistice, our units left for England, where we were integrated into the Coastal Defense against the threatened Invasion. In 1944 we returned as Armored Brigade with the Allied Forces to France. On a voluntary mission, I was seriously wounded (an open, complicated fracture of the femur and of the hip joint). Brave comrades risked their life to bring me back behind the lines. I was

taken to a field hospital. From there I was flown to the special orthopedic hospital in Basingstoke, England. Fortunately penicillin and conserved blood had just been introduced in the Army. I had several operations and for the next three months I received painful penicillin injections every three hours. I and even my leg survived.

"After the war I was repatriated with the other Czech invalids. Still on crutches, I got my MD from the Charles University in Prague in 1947. After a stint in Pathology, I specialized in Internal Medicine and in Cardiology. In 1951, I became a member of the Institute of Cardiovascular Research in Prague. I studied problems of pathogenesis and therapy of hypertension. For animal experiments we used intact non-anesthetized dogs, where we recorded blood pressure as well as heart rate and their acute changes with a capacity manometer put on a carotid artery sewn into a skin loop. With K. Fronek we found, for instance, that 'nervous hypertension,' whether it was caused either by carotid sinus- and aortic arch denervation, or by excitement of the animal, or by nervous stress, was always accompanied by heart rate increase. In all pressoreceptor denervated animals, this tachycardia was still maintained 10 months after the denervation, whereas the resting blood pressure in each animal had returned to the preoperative level. Heart rate increase is a permanent consequence of pressoreceptor denervation, whereas elevation of blood pressure is not permanent. Nervous abnormality or dysfunction, therefore, cannot be a pathogenetic factor in essential hypertension, as was generally assumed, because patients with essential hypertension have no tachycardia unless cardiac insufficiency develops. Hypertension in this disease is permanent, unless it is successfully treated. These clear facts did not convince the reviewers of cardiovascular journals. The paper appeared in a journal for autonomous nerve physiology, *Acta Neurovegetativa*.

"With Z. Harant and others, we clinically analyzed the long-term effect of various anti-hypertension therapies in use at this time. We also studied the effect of these therapies on the circulation and the behavior of dogs. In general, our results did not confirm their therapeutic effectiveness, claimed in the literature at that time. For instance, the therapy of hypertension with prolonged

sleep was 'ideologically recommended' by the authorities of Soviet Russia and its Satellites. Behind the Iron curtain it took guts to publish our results that prolonged sleep therapy is totally ineffective against hypertension. Another example: The Indian plant 'Rauwolfia' marketed by Ciba Basel was reported, in many papers from different countries, to lower the blood pressure of all hypertensive patients. We followed hypertensive patient during prolonged treatment with Rauwolfia and found that the initial fall in blood pressure lasted a few weeks only. Subsequently, the pressure rose again. However the patients became listless, unmotivated and depressed. In dogs, oral Rauwolfia, in corresponding doses, also lowered the blood pressure for few weeks only. The animals lost normal activity and the capacity to differentiate between the meanings of signals. We were able to publish the experimental results with dogs. However, our findings about the effect of continuous treatment of people with Rauwolfia were rejected by the reviewers of every clinical journal where they were submitted. The reviewers pointed to the praise of the therapy in the press, where only short term results had been reported so far, and to the theories of 'the specialist' Dr. Bein of Ciba. During the time we were approaching one journal after another, we read in the press about suicides of people who had been treated for hypertension. One of these was the famous writer Hemingway. Hypertension was often suspected to be the cause of the depression, when it was in reality caused by the treatment with Rauwolfia. Professor M. Vogt in Scotland described then the real effect of Rauwolfia. It removes epinephrine and norepi from nervous tissues, specially also in the brain. Finally, clinical papers from other authors succeeded to get published, reporting that Rauwolfia is not a suitable drug for the treatment of hypertension or for any other long-term treatment. I discussed our experimental findings of the cardiovascular and behavioral effects of various drugs used then in the treatment of hypertension or of clinical depression in the monograph 'Pharmaco-dynamic Analysis of Circulatory Reactions to Stimuli from the Environment,' published for countries on both sides of the Iron Curtain by Gustav Fischer Verlag Jena. It was sold out in a year.

"In 1966 my family and I left then communist Czechoslovakia in a danger-

ous but successful escape in order to live in a democracy. I accepted an invitation by the extraordinary group of cardiopulmonary physiologists led by Richard Riley and Solbert Permutt, to continue my research at Johns Hopkins. From the onset of my experimental work I used mostly intact animals, as I was aware of the pitfalls caused by the fact that the generally accepted model of blood circulation was based exclusively on experiments with anesthetized, open-chest animals. At this time I became better equipped than I was before to study the laws of blood circulation and of its regulation in the intact, awake mammal. Indwelling catheters, implantable flow probes, and computers became available. The electronic measurement of pressure and, specifically, of flow rendered the previous necessity, of evaluating steady states only, into a prejudice that prevented dynamic evaluation of the way steady states are established. In instrumented, intact, and awake dogs, we could continuously follow cardiac output, aortic pressure, pressure in cardiac ventricles and atriums, coronary flow, pleural pressure and values from any circulatory area of interest.

"The results of many interesting projects, carried out together with several valuable colleagues and talented students, forced us to recognize that the mammal organism does not regulate blood pressure, but it regulates blood flow to serve the metabolic needs of the body at any given moment. The blood pressure, on the other hand, indicates the degree of filling of the arterial bed, that is, the relation of the actual blood volume in the arteries to the actual volume of the arterial bed. It is also the upstream pressure to arterial flow.

"For the analysis of our findings we had used, during many years of work, the generally accepted concept of peripheral resistance to arterial flow. Its values are computed on the assumption that the downstream pressure to arterial flow is, in all arterial beds and under all conditions, zero. This assumption was never proven and the concept was not helpful. We became acquainted with the concept of 'vascular waterfall' by Permutt and Riley. These authors arrived at this concept by connecting several pressure/flow values into a resistance line. After each flow-change they waited for a few minutes to reach steady state, before reading the values. In various experimental arrangements, we carried out 'instantaneous'

pressure/flow investigations, where all tested pressure/flow values of one maneuver were recorded within three seconds. The arterial bed should have practically no time to adapt to the quick change in flow. Therefore, our pressure flow lines were straight, indicating that the resistance in the arterial bed did not change during the short maneuver.

"Using instantaneous pressure/flow investigations, we found in still standing dogs an intercept of the resistance line with the pressure axis of about 50mm Hg. We understood that this intercept indicates the mean of the pressures in all the arterioles which are at this moment open to perfusion. That was the mean downstream-pressure to flow (dptf) from all the arterial beds in our still standing dogs. In resting dogs the dptf in the femoral arteries, mainly delivering blood to skeletal muscles, was also found to be about 50 mm Hg. The dptf in the renal arteries of resting animals, however, was about 10 mm Hg. Dptf in coronary arteries of open-chest dogs was about 30 mm Hg. It is the functional state of the arterioles, the opening pressure in the perfused arterioles which is the dptf in the arterial bed. It regulates the blood flow to the supplied organs in accordance with the actual needs of the organs in any given moment.

"F. Schrijen, a French Fulbright Scholar in our lab, found in awake, intact dogs that deep inspiration lowers stroke volume and is followed by an increase in coronary flow. The lower pressure in the chest and, therefore, in the heart, against the unchanged pressure in the rest of the organism, elevates the after-load to the left ventricle and lowers, therefore, the stroke volume. The bigger workload for the heart muscle elevates coronary flow. However, no US journal in the field accepted the manuscript. After it was published in *Pflugers Archive* in Germany, it became our most quoted paper, even in the journals which had originally rejected it.

"Such results and their interpretation led to a new understanding of blood circulation and its regulation. At rest dptf in arterial beds of abdominal organs is far lower than the dptf in most other arterial beds of the mammal. The cardiac output is relatively small and a relatively large part of it is directed to abdominal organs for house-keeping. When an animal has to move suddenly, the pressure in the aorta falls precipitously, because far more arterioles in

skeletal muscles open quickly, to serve the far greater metabolic needs of the exercising muscles. The outflow from the arterial bed is greater than the inflow. The blood volume in the arterial bed and, therefore, the blood pressure fall. The backpressure to the ejection from the left ventricle falls. The aortic valve opens earlier, closes later and the ventricle empties more thoroughly. The end-diastolic- and the atrial pressures fall. The cardiac output increases. The rising cardiac output, the quicker return of more blood through the beds in the muscles as the supply of the house-keeping organs is limited, and the lower end-diastolic pressure increase the venous return to the heart progressively. The progressively rising cardiac output fills the enlarged arterial bed. The blood pressure reaches the original values or gets slightly higher. This stops further increase in cardiac output. A steady state, appropriate to the degree of muscular work, is established. These intrinsic circulatory mechanisms can adapt the cardiac output to the metabolic needs of the mammal even if the heart is denervated and the sympathetic nervous branches are severed. The intact nervous system makes it only possible to anticipate the need of regulatory change and to speed it up.

"The reaction to excitement, however, needs intact innervation, at least of the heart. The excited heart increases the rate and strength of contractions. The increased output into the unchanged or diminished arterial bed, increases filling of the arterial bed and elevates, therefore, the blood pressure. The elevated after-load limits the further increase of cardiac output. A steady state is induced where a small increase of cardiac output is accompanied by a marked blood pressure elevation. This is different from the circulatory reaction in exercise, where a substantial increase of cardiac output is not accompanied by a marked pressure elevation, as long as excitement is not involved too. Fight or flight reactions are certainly combinations of both kinds of reactions.

"After retiring from the lab at 70, I followed my interest in History of Medicine. I found that the pacemaker in the mammal heart was not discovered by Keith and Flack to whom the discovery is attributed. It was instead discovered by McWilliams (1888) and published at the time when Keith was a medical student taught by McWilliams in Edinburgh. The pacemakers were

investigated later by Hering (1900), Wenckebach (1898, 1903) and others, before the publication of Keith and Flack (1907) appeared. I found that the muscular connection between the right atrium and both ventricles was found by Kent and Hiss (1893). Tawara (1907) called this connection later the atrioventricular node. Tawara's original discovery, however, was that the atrioventricular pathway is connected with the muscles at the tip of heart by the Purkynje fibers.

"With my wife Helli we had three children and seven grandchildren. After we had been married for 62 years, Helli died in 2002. Later, two great-grandchildren were born. I married Francine Schrijen, the retired French scientist who had worked in our lab 34 years ago.

"I thank you for your interest and for giving me the chance to tell you and other members of APS about life and physiological research in my time."

Letters to Peter Lauf

Allan M. Lefer writes: "Thank you for your kind letter which arrived on my 70th birthday Feb. 1, 2006. I have some thoughts which I would like to share with colleagues both young and old. My story of retirement is a bit different from most of those I have read in *The Physiologist*.

"I retired in September 2001, at the age of 65, for two major reasons. Firstly, I promised my wife Mary that I would step down while I was still close to my peak level of quality and vigor. Towards that end, I retired while I still had two research grants and a training grant, still published ten or more peer reviewed papers annually, still mentored two postdoctoral fellows, and still chaired the Department of Physiology at Thomas Jefferson University. During my 39 years of academic life, I published 638 peer reviewed papers and co-edited eight books. Therefore, I felt that I had made sufficient contributions to the scientific literature to feel comfortable in stepping down.

"Secondly, I strongly felt and still feel that many of us senior scientists should move over and make room for the younger generation of scientists coming along. I felt that way after talking to my two sons who are academic scientists and too many of my former fellows and students. I am very proud that both of my sons chose academic research and education as a career path. Some of you

know my older son David, who is a Professor of Medicine at Albert Einstein College of Medicine and is engaged in cardiovascular physiologic research there. My younger son, Barry, is an Assistant Professor at The University of Houston in Environmental Sciences. He is an atmospheric chemist working on air pollution. Interestingly, we all three have an interest in nitric oxide albeit from different perspectives. Furthermore, many of my former students and fellows keep in touch, and one recently wrote that he is a student of mine 'forever.' I considered all of my 20 predoctoral students and 28 postdoctoral fellows as sons or daughters. Although many of my contemporaries eschewed retirement to continue their work, I strongly feel that we need to afford our 'scientific offspring' a full opportunity to develop and thrive, much like we did in the 'Golden Age' of science. Toward this end, we need to step down and free up both line item budget positions and laboratory space to them.

"I actually planned my retirement over two years before I stepped down. I went to my Dean and suggested that I stage a gradual retirement over two years, progressively working fewer days each year until I fully retired two years later. I had an excellent administrative assistant so that the department ran smoothly and I cut down to two senior postdoctoral fellows who could carry the research effort with only moderate supervision. In this manner, I prepared myself for retirement with only minimal disruption to my colleagues and associates.

"Whereas most of my contemporary colleagues still work in the lab and keep up the good fight with grant review panels and editorial boards, I chose to take up golf a year before I retired. Four years ago, Mary and I moved to Hilton Head Island, SC where we live in a lovely gated community on a beautiful golf course to which we belong. We play golf about five times a week and thoroughly enjoy it. Any of my old friends who are in the area, come join us for a pleasant round of golf. We have made many new friends from our golf club and the neighborhood and we love living here in a corner of paradise, while many of our old friends still in science indicate that their frustration level seems to be increasing with time. I salute and applaud my colleagues still 'toiling in the vineyards' of science. However, perhaps we should heed the advice Tennyson, who wrote in his epic poem *Ulysses* 'Come my friends, 'Tis not too late to seek a newer world.'"

Mortimer Levy writes: "Thank you for your kind inquiry concerning my present activities.

"Your letter reminded me that I will be age 70 on June 20th of this year. On January 1, I completed 37 years of service here at McGill University, with a dual appointment in both the departments of Physiology and Medicine. I have spent most of my career as an academic clinician, with my laboratory in the physiology dept. (situated in McGill's medical bldg.), while serving as a Nephrologist in the Royal Victoria Hospital, a teaching hospital of the McGill Univ. Health Centre. My laboratory was heavily involved in a study of the factors determining sodium retention in dogs with edema formation, i.e., the dog with partial thoracic caval constriction and the dog with experimental liver cirrhosis. It was findings in our laboratory that have led most physiologists to realize that sodium retention in Generalized edema formation is a biphasic phenomenon, i.e., that sodium retention begins in a pre-edematous phase where the ECF becomes 'overfilled' and in a second phase where Starling forces become sufficiently perturbed, edema occurs by 'overflow' and the effective arterial volume becomes 'underfilled.'

"After 33 years, I finally closed my laboratory in 2002, after spending the last 15 years examining the actions of ANP in models of canine edema. Working with dogs was becoming prohibitively expensive, and studies of whole organ integrative physiology were not looked upon with favour by study committees.

"Like many other senior physiologists, I am now saddened that current graduate students in our department while being expert in many aspects of molecular biology and cell physiology, seem to have little knowledge of how intact organs actually function.

"While not actually engaged in the laboratory, I spend a great deal of time mentoring younger colleagues, serving on thesis committees and completing various scientific writings. I am very involved in Kidney physiology teaching, lecturing in an elementary and intermediate course to Science students. I also direct an advanced course in renal and epithelial transport physiology, offered to final year Physiology students and postgraduate students. After lecturing to first year medical students for 35 years, I have given this up, but still serve as a small group tutor for 12 hours. Physiology lecture time has been

reduced with added emphasis on interactive and self-learning (computer-based), a maneuver that does not seem to be conducive to more knowledge acquisition.

"After serving as chairman of our Nephrology division for 15 years, I stepped down at the end of 1998, but I am still very active in clinical work, serving on our very busy Consult service, our hemodialysis service, and I am currently serving as acting director of our peritoneal dialysis service. I am heavily involved in the teaching of medical students in the hospital as well as nephrology and medical residents. I am particularly interested in teaching these groups to bring a physiological perspective to their clinical reasoning.

"I still serve on several faculty committees, e.g., the promotion committee. Though working full-time at the present, I plan to retire fully in about three to four years, but still work in an outpatient nephrology clinic for one morning per week. Once again, thanks for asking about my present activities."

Alfred Lawton wrote: "As my 90th birthday approaches I remain proud to have been a Physiologist. It is true that we are 'fearfully and wonderfully' made.

"The last of my teachings was a course in Exercise Physiology but even that was almost six years ago. Mostly now it is my medical training that is put to use.

"My writings have all been published, lost, or destroyed. That is good for the passing years cause one to fall behind. It's a long road from smoked drum tracings to computer print outs. Retirement clears away the road for youth to make continued progress in understanding our scientific discipline."

Ben Libet writes: "Thank you for your greeting from the Physiological Society on my forthcoming 90th birthday, April 12. I am still academically active to some degree. I have recently written and sent off an article (titled 'Reflections on the problem of brain mind interaction') to the journal *Progress in Neurobiology*. This journal is collecting articles by former colleagues of the late Sir John Eccles, the great neurophysiologist of the 20th century. Two large issues of this journal will be published in 2006.

"I also wrote a book (*Mind Time*) on my experimental work on brain and consciousness, published in 2004 by Harvard University Press. A paperback edition followed in 2005. There are now

published translations in German, Japanese and Italian. I started this work, with awake human subjects, in 1958, with the experimental neurosurgeon, Dr. Bertram Feinstein. (He was married to Dianne Feinstein, the current US Senator from California.)

"Also, I carried out a long series of animal experiments on sympathetic ganglia, in which we discovered and analyzed synaptic responses with durations ranging from 10 msec. through 100s of

msec. and up to 30 minutes!

"As for advice to our younger colleagues, I encourage them to sustain their creative activities in research, into and beyond their retirement date. I thought I would never retire from the researches I was progressing with. The latest experiments I carried out were in a series on the time factor for brain production of a conscious experience, done when I was 70-75 years old. This important, difficult result was published in

Brain in 1991. Of course, one loses the lab facilities and energy to continue with experiments. I would note that I am one of the older generation who does not have or use a computer (I don't boast about that)!

"Thanks again for your interest and best wishes to all the physiologists, especially those who may remember me or be aware of my works." ❖

Book Review

Case-Based Medical Physiology.

Christopher Bell, Cecil Kidd, and Trefor Morgan.

Oxford, UK: Blackwell Publishing, 2005, 176 pp., illus., index, \$29.95.

This book consists of 19 clinical cases that together "cover" much, but certainly not all, of the physiology normally encountered in a medical physiology course.

Each case begins with a "Case Introduction" which is a brief description of the presenting complaint of the patient. As the case unfolds and additional data is made available, questions are interspersed throughout the text, most in a multiple choice format, others requiring a brief free response from the student. Patient data, or illustrations of normal physiology, are presented in graphical and tabular form. Following completion of the case "MCQ Answers and Feedback" are provided. Next is found a "Case Review" or summary and a short list of "Key Points." Finally, there is a brief "Additional Reading" list.

It is critical in evaluating this book to ask how it is meant to be used by medical students, the stated audience for this volume. Unfortunately, the authors provide almost no help in resolving this issue. They indicate, in a brief Preface, that this book can be used by students in a "problem-solving" or a more "traditional" curriculum (their terms). But nowhere do they offer any suggestion about what it would mean to "use" this book in a medical curriculum.

So, let me propose several possible uses for a book of clinical cases like this one. One way to use cases is as problems to be solved by small groups of students (At Rush we call them "small group problem solving workshops," but

the label really doesn't matter). The case can be addressed piece by piece first by smaller groups of students and by all of the workshop participants in plenary session. This format helps students integrate the knowledge that they accumulated. It also helps them develop the reasoning skills needed to start with a set of signs and symptoms and determine possible (patho)physiological mechanisms that could explain how the patient came to be in the state described in the case.

Alternatively, one might organize a lecture block in the course around a clinical case, using it to help students generate learning issues ("what physiology do I need to understand to understand this case") and practice applying their growing understanding of physiology to solving problems (the questions in the case).

Finally, some students might find this book of use in reviewing for course exams or even national licensing exams.

How well will this book serve students attempting to use it in any of the ways described above? The cases seem to be well chosen and appropriate for students learning physiology. Any particular instructor is likely to rue the absence of a favorite teaching case or two, but, on the whole, the selection included in the volume is a good one.

However, the questions inserted into cases are rather a mixed bag. Most of the questions are in a multiple choice format, with many using features that the psychometricians tell us are to be avoided (all or none of the above, stems with "except"). Many of the multiple choice questions are simply aimed at testing recall of information. Others address questions about (inferences from) the patient data presented in the case. These are more challenging as they require the student to apply what

they know to solving a problem.

The quality of the explanations for the answers is as important as the quality of the questions, and here I was frequently disappointed. Many explanations, even when correct (as far as I know), were not particularly helpful to students whose understanding of the physiology is limited. The fact that there is only a little didactic explanation of physiological phenomena imbedded in the case means that students may find it difficult to fully understand the important ideas that the cases are meant to illustrate.

One small concern about this book arises from the nationalities of the authors - Irish, Scottish, and Australian; the spelling is British ("oedema") not American ("edema") although in most cases this shouldn't be a real problem. On the other hand, some of the medical terminology is different from the terminology used in American medical practice and this could be a source of some confusion.

On the whole, then, this is an interesting and potentially useful learning resource for both students and teachers of medical physiology. It provides a clinical context for many of the most important concepts that physiology teachers would like their students to master. It is NOT a replacement or a substitute for a physiology textbook, although it might usefully supplement a textbook. Nor is it a substitute for the board review books that so many American medical students use to prepare for the USMLE exam, although it might very well help students prepare for an exam that is now much more integrative and clinical than it was it once was in the past. ❖

Joel Michael
Rush Medical College, Chicago, IL

The Wine Wizard Peter Wagner

Not having received personal threats from any of you, I dare to do it again for this issue of *The Physiologist*. As I mentioned before, locating specific wines can be difficult. The internet and your local wine shop are good sources for finding wines that don't appear on the super-market shelf. Here we go:

White wines:

Several terrific New Zealand Sauvignon Blancs are reaching the USA in significant volume and are all well-worth trying to find. Those of special note are:

a) Villa Maria 2005 private bin (\$10-13). Great value, bursting with gooseberry, herbal, grassy fruit, solid structure and mouth feel, and good but not mouth puckering acidity. Clean, very good length. Outstanding.

b) Saint Clair 2004 (2005 should soon be here) (\$12-15). Almost as good as Villa Maria, same style, same comments but just 3+ rather than 4+ on all fronts.

c) Babich 2004 or 2005 (\$9-12) same level as Saint Clair, and again with all the juicy herbal



Peter Wagner

lime/passion fruit/gooseberry fruit and acid that makes the NZ SB's so desirable.

Remember, drink young and cool, not cold (the wine should be young and cool, you do not have to be). I promise to move to other white varietals next time.

Red wines:

Just as I dream of NZ SB's, I dream of

Australian Shiraz's. The same grape as Syrah in France, in Oz they make this their specialty in red wines. The very best are unaffordable but there is a whole bag full of delicious Shiraz at \$10-20 available now. They may not be easy to find in quantity, but if you do you will be happy if you like big, juicy, fruit-driven (usually blackberry) reds that have very evident but balanced (usually American) oak flavors of dill and vanilla, and generally soft tannins for the strong fruit. Look for current vintages of Penfolds Kalimna bin 128 (\$15-20); Penfolds bin 389 Shiraz/Cabernet blend (\$20-25), Step Road 2003 (\$14-16); Pirramimma 2001 or so (\$16-20); Peter Lehman any vintage (\$15-20). In fact, you will likely not go wrong with any Australian Shiraz in this price range. They will vary in detail and perhaps in "bigness," but they are almost always well-made and easy to drink. So try any you can find and judge for yourself. By the way, if you can afford the unaffordable, you can try Penfolds Grange, Henschke Hill of Grace, Elderton Command, Leasingham Classic Clare, Lindemans Limestone Ridge. These Shiraz are listed in decreasing order of price from about \$300 to about \$40 a bottle, and are very hard to find. ❖

Books Received

Calcium Signaling.
Second Edition.

James W. Putney, Jr., (Editor).
Boca Raton, FL: (CRC) Taylor & Francis, 2006, 509 pp., illus., index, \$159.95.
ISBN: 0-8493-2783-0.

Molecular Interventions in Lifestyle-Related Diseases.

Midori Hiramatsu, Toshikazu Yoshikawa, and Lester Packer.
Boca Raton, FL: (CRC) Taylor & Francis, 2006, 354 pp., illus., index, \$199.95.
ISBN: 0-8247-2958-7.

Oxidative Stress and Age-Related Neurodegeneration.

Yuan Luo and Lester Packer, (Editors).
Boca Raton, FL: (CRC) Taylor & Francis, 2006, 499 pp., illus., index, \$169.95.
ISBN: 0-8493-3725-9.

2006

FASEB Summer Research Conferences

Saxtons River, Vermont

- Nucleic Acid Enzymes
- Virus Assembly
- Biological Methylation
- Molecular Biophysics of Cellular Membranes
- Phospholipases
- Regulation & Function of Small GTPases
- Ubiquitin & Cellular Regulation
- Protein Folding in the Cell
- Mechanisms of Plant Development
- Transcriptional Regulation During Cell Growth, Differentiation & Development

Snowmass Village, Colorado

- Transplantation Immunology
- Amyloid Fibril Formation, Protein Misfolding & Aggregation: Chemistry, Physiology & Disease
- Trace Element Micronutrients: Integrating Basic & Applied Research
- Post-transcriptional Control of Gene Expression: Mechanisms of mRNA Decay
- Calcium & Cell Function
- Protein Phosphatases
- Liver Growth, Development & Disease
- Smooth Muscle
- Lung Surfactant: Cellular & Molecular Biology
- AMPK: Impact of Mammalian Metabolism & Disease

Indian Wells, California

- Poxviruses
- Retinoids
- Yeast Chromosome Structure, Replication & Segregation
- Retinal Neurobiology & Visual Processing
- Protein Lipidation, Signaling & Membrane Domain
- Folic Acid, Vitamin B12 & One Carbon Metabolism
- Lymphocytes & Antibodies

Tucson, Arizona

- Microbial Polysaccharides of Medical Agricultural & Industrial Importance
- Dynamic Structure of the Nuclear Hormone Receptors
- Molecular Biology of Lipid Absorption & Metabolism
- Membrane Organization by Tetraspanins & Small Multi-Transmembrane Proteins
- Mechanisms of Action of Steroid Hormones; Integration of Membrane - & Nucleus - Mediated Effects
- Neural-Immune Interaction: Pathological Mechanisms & Repair

Mailing List

To be added to our mailing list, contact:
FASEB Summer Research Conferences
FAX: 301-634-7007
jlevin@faseb.org; mcgovern@faseb.org

Information & Application
Available in March on our web site- <http://src.faseb.org>
FASEB Members Will Automatically Receive the Meeting Notice

May 9-10

I W P P C A S - 1 - First International Workshop on the Pharmaceutical Physical Characterization of the Amorphous State, Stamford, CT, USA. *Information:* ASSA International. E-mail: workshops@assainternational.com; Internet: http://www.assainternational.com/workshops/IWPCPS_8/IWPCPS_8.cfm.

August 3

3rd Annual Symposium of the American Heart Association Council on Basic Cardiovascular Sciences - Translation of Basic Insights into Clinical Practice, Keystone, CO. *Information:* <http://www.americanheart.org/presenter.jhtml?identifier=3032066>.

May 11-12 31-

NIMH Division of Intramural Research Programs Pre-doctoral Research Festival, Bethesda, MD. *Information:* Margarita Valencia. Tel.: 301-451-4512; Email: mv36t@nih.gov; Internet: <http://intramural.nimh.nih.gov/ResearchFestival>.

May 16-20

The American Society of Hypertension, Inc. 21st Annual Scientific Meeting and Exposition-Linking Blood Pressure and Cardiovascular Health, New York, NY. *Information:* http://www.ash-us.org/annual_meeting/index.htm.

May 24-29

8th Meeting of the European Federation of Autonomic Societies, Lisbon Faculty of Medicine, Lisbon, Portugal. *Information:* Professor Isabel Rocha, Instituto de Fisiologia, Faculdade de Medicina de Lisboa, Av. Professor Egas Moniz, 1649-028 Lisbon, Portugal. Tel: 35 12 1799 9434; Email: isabel-rocha@fm.ul.pt; Internet: <http://www.efas2006.fm.ul.pt>.

May 31-June 4

Membrane Proteins in Health and Disease, Niagara-on-the-lake, Ontario, Canada. *Information:* Email: r.reithmeier@utoronto.ca; Internet: http://www.csmbc.ca/e_index.html.

June 24-29

31st FEBS Congress - Molecules in Health and Disease (hosted by Turkish Biochemical Society), Istanbul, Turkey. *Information:* ODS Congress Management Sari Asma Sok. No: 8, 34464 Yenikoy - Sariyer, Istanbul - Turkey. Tel: +90 212 299 99 80; Fax: +90 212 299 99 77; Email: febs@febs2006.org; Internet: <http://www.febs2006.org/>.

June 28-July 1

5th International Congress of Pathophysiology, Beijing, China. *Information:* Prof. Liling Wu, Secretary General of ISP2006, Department of Pathophysiology, Peking University Health Science Center, 38 Xueyuan Road, Beijing 100083, China. Fax: +86 10 82802403; E-mail: wull@isp2006.org.cn or pathophy@bjmu.edu.cn; Internet: <http://www.isp2006.org.cn>.

June 29-July 1

4th International Society for Stem Cell Research Annual Meeting, Toronto, Ontario, Canada. *Information:* ISSCR, 60 Revere Drive, Suite 500, Northbrook, IL 60062. Tel: 847-509-1944; Fax: 847-480-9282; Email: isscr@isscr.org. Internet: <http://www.isscr.org>.

July 3-7

The Third International Symposium on Aero Aqua Bio-Mechanisms (ISABMEC 2006), Okinawa, Japan. *Information:* <http://abmech.org/isabmec2006/>.

July 5-7

The Physiological Society - Main Meeting 2006, University College London, UK. *Information:* <http://meetings/physoc.org/ucl/index.asp>.

July 31-August 3

3rd Annual Symposium of the American Heart Association Council on Basic Cardiovascular Sciences - Translation of Basic Insights into Clinical Practice, Keystone, CO. *Information:* Internet: <http://www.americanheart.org/presenter.jhtml?identifier=3032066>.

August 13-17

First International Congress of Respiratory Biology (ICRB), Bonn-Bad Honnef, Germany. *Information:* Steven F. Perry, Ph.D. University of Bonn, Germany. Email: perry@uni-bonn.de; Internet: <http://www.respirbiol.org>.

September 2-6

European Respiratory Society 2006 Annual Congress, Munich, Germany. *Information:* <http://www.ersnet.org>.

September 3-8

2006 Gordon Research Conference on Molecular Mechanisms in Lymphatic Function and Disease, Les Diablerets, Switzerland. *Information:* <http://www.grc.org/>.

September 6-9

Cardiac Energy Metabolism in Heart Failure: From Concepts to Therapies, Semiahmoo Resort, near Seattle, Washington, USA. *Information:* Society for Heart and Vascular Metabolism. Email: heartmetabolism@yahoo.com; Internet: <http://www.heartmetabolism.org>.

September 7-10

Genomic Perspectives to Host Pathogen Interactions, Hinxton, Cambridge, United Kingdom. *Information:* Cold Spring Harbor Laboratory, Meetings & Course Program, PO Box 100, 1 Bugtown Road, Cold Spring Harbor, NY 11724-2213. Tel: 516-367-8346; Fax: 516-367-8845; Email: meetings@cshl.edu; Internet: <http://www.cshl.edu/meetings>.

September 16-20

5th European Congress of Biogerontology, Istanbul, Turkey. *Information:* <http://www.biogerontology2006.org>.

September 28-October 1

Integrative Approaches to Brain Complexity, Hinxton, Cambridge, United Kingdom. *Information:* Cold Spring Harbor Laboratory, Meetings & Course Program, PO Box 100, 1 Bugtown Road, Cold Spring Harbor, NY 11724-2213. Tel: 516-367-8346; Fax: 516-367-8845; Email: meetings@cshl.edu; Internet: <http://www.cshl.edu/meetings>.

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- *American Journal of Physiology-Heart and Circulatory Physiology*
- *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*
- *American Journal of Physiology-Renal Physiology*
- *Advances in Physiology Education*
- *Journal of Applied Physiology*
- *Journal of Neurophysiology*
- *Physiology* (formerly *News in Physiological Sciences*)
- *Physiological Genomics*
- *Physiological Reviews*
- *The Physiologist*

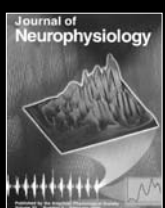
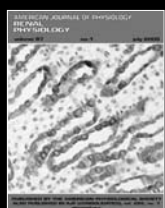
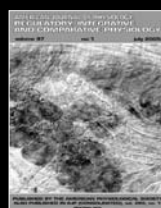
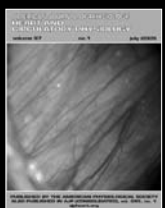
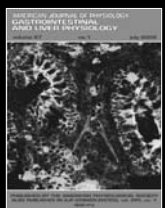
For more information contact:



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2006 CONFERENCES

Comparative Physiology 2006: INTEGRATING DIVERSITY

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- The Physiology of Long-Distance Avian Migration
- Steroidal Regulation of Amphibian Developmental Physiology and Behavior
- Survival Physiology: A Reassessment of why Big, Fierce Animals are Rare
- The Comparative/Ecological Physiology of Nectar-feeding Birds: The Last 15 Years
- Necrophysiology

SYMPOSIA

- Passing Gas: The Vascular Biology of NO, CO and H₂S
- Design - Molecular Basis and Evolution of Muscles for Different Activities
- Complexity in Physiological Systems: Recognition, Definitions, Modeling, and Predictions
- Energizing Transport Across Epithelia in Insects
- Molecular Aspects of the Mechanisms of Hibernation
- Fuel Selection during Exercise: Mechanisms, Ecological and Evolutionary Implications
- Physiological and Molecular Responses to Cold and Desiccation Stress in Ectotherms
- Linking Body Size and Physiology with Life History: Walking in the Footsteps of Bill Calder
- Physiological Adaptation of Fishes to Life at the Extremes
- Field Metabolic Rate - FMR: Physiological Traits and Ecological Implications
- Comparative Biology of Aging in Long-lived Animals
- Comparative Mechanisms of Respiratory Rhythm Generation and Chemoreception
- Hypoxic Effects on Vascular Tone: Mechanisms of Hypoxic Vasoconstriction in Vertebrates
- Muscles as Springs: Molecules to Movement
- Blood Rheology "Abnormalities" in Marine and Terrestrial Animals: What Lessons Can We Learn?
- Comparative Molecular Physiology of Acid-base Regulation
- Aquaporins and Aquaglyceroporins in Vertebrates: Evolution and Diversity
- Dividing the Undivided: Shunting and Flow Separation in Reptile Hearts
- Biomedical Applications of Suspended Animation
- Comparative Nutritional Physiology: Nutrient and Toxicant Absorption, Postabsorptive Fate, and Ecological Implications



October 8-11,
Virginia Beach,
Virginia

Physiological Genomics and Proteomics of Lung Diseases

SYMPOSIA

- Genomics and Proteomic Approaches to Studying Lung Disease
- Proteomic and Genomic Approaches to Developing Potential Therapeutic Targets
- Genomics and Proteomics of Airway and Vascular Disease
- Genomics and Proteomics of Environmental Lung Disease
- Acute Lung Injury and Inflammation



November 2-5,
Fort Lauderdale,
Florida

For Information on these upcoming APS Conferences, visit:

www.the-aps.org/meetings/

ANNOUNCING

American Physiological Society Resource Book for the Design of Animal Exercise Protocols

The American Physiological Society (APS) announces the Publication of a *Resource Book for the Design of Animal Exercise Protocols* intended for researchers, Institutional Animal Care and Use Committees (IACUCs), and those involved with research oversight. The authoring committee, which was comprised of exercise physiologists and laboratory animal veterinarians, reviewed reference material and drew upon their own experience to compile suggestions about how to design, review, and implement experimental paradigms involving animals and exercise.

The APS Resource Book is intended to promote an informed dialogue that can help researchers and their IACUCs arrive at satisfactory answers to questions about how to assure the welfare of animals in exercise research protocols.

Topics addressed in the APS Resource Book include general concerns such as selecting appropriate animal models for exercise research, study design considerations, animal stress, working with compromised animals, and the impact of surgery on exercise. (See excerpts from the Table of Contents at the right).

Resource Book for the Design of Animal Exercise Protocols



COMMITTEE TO DEVELOP A RESOURCE BOOK FOR
ANIMAL EXERCISE PROTOCOLS

American Physiological Society
9650 Rockville Pike
Bethesda Maryland 20814-3991

In addition to some 400 citations, the book includes appendices on hind limb suspension and immobilization of rats and mice and a set of sample animal exercise protocol review scenarios.

TO ORDER: NIH's Office of Laboratory Animal Welfare (OLAW) sponsored the development of the APS Resource Book, and single copies are available free of charge from OLAW while supplies last. Contact OLAW@od.nih.gov to request a free copy.

Copies may also be purchased for \$9.50 each from the APS. To order, go to the APS website at: www.the-aps.org/store/

The PDF of the book is available online at <http://www.the-aps.org/pa/action/exercise/>

TABLE OF CONTENTS (excerpts)

CHAPTER 1. INTRODUCTION AND OVERVIEW

- I. Scope of the Document
- II. Why Study Exercise?
- III. Why Use Animals to Study Exercise?
- IV. Animal Research Oversight

CHAPTER 2. GENERAL ASPECTS OF ANIMAL CARE AND THE DEVELOPMENT OF ANIMAL USE PROTOCOLS

- I. Overview
- II. Selecting Animal Models for Exercise Research
- III. Study Design Considerations
 - A. Protocol Development
 - B. General Considerations for Exercise Study Design
- IV. Animal Stress and Humane Study Design
 - A. Stress and Exercise
 - B. Subject and Stressor Characteristics
 - C. Indexes of Acute and Chronic Stress Responses
- V. Working with Compromised Animals: Animal Models of Disease that Limit Exercise Performance
 - A. Special Considerations for Training Compromised Animals
 - B. Disease Models that Limit Exercise Capabilities
- VI. Impact of Surgery on Exercise
 - A. Surgical Procedures on Animals Used in Exercise Studies
 - B. Selecting Anesthesia for Animals in Surgery

CHAPTER 3. EXERCISE PROTOCOLS USING RATS AND MICE CHAPTER 4. EXERCISE PROTOCOLS USING LARGE ANIMALS CHAPTER 5. EXERCISE PROTOCOLS USING OTHER SPECIES

Chapters 3, 4, and 5 include modalities such as treadmill, swimming, and exercise wheels.



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Bethesda, MD 20814
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MEMBERSHIP APPLICATION FORM

The American Physiological Society

1. Check membership category you are applying for: Regular Affiliate Student
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4. Name of Applicant: _____
Last Name or Family Name / First Name / Middle Name
5. Date of Birth _____ Optional: Male Female
Month / Day / Year
6. Institution Name _____ Department _____
(Please do not abbreviate Institution Name)
7. Institution Street Address _____
8. City/State/Zip/Country _____
9. Home Address (**Students only**) _____
10. Work Phone _____ Home Phone _____
11. Fax _____ E-mail _____

12. **EDUCATIONAL STATUS:** ► **IMPORTANT for STUDENTS: **If you are enrolled as a student for an advanced degree (Ph.D., M.D., D.V.M.) please include the month and year you expect to receive your degree.**

| Dates** | Degree | Institution | Major Field | Advisor |
|---------|--------|-------------|-------------|---------|
|---------|--------|-------------|-------------|---------|

13. **WHAT IS YOUR SECTION AFFILIATION?** Please identify and rank up to three sections to which you desire affiliation. (e.g., 1 = primary affiliation, 2 = secondary affiliation, 3 = tertiary affiliation). **There can be only one "Primary" affiliation.**

- | | | |
|--|--|--|
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| <input type="checkbox"/> Cell & Molecular Physiology | <input type="checkbox"/> Environmental & Exercise Physiology | <input type="checkbox"/> Respiration Physiology |
| <input type="checkbox"/> Central Nervous System | <input type="checkbox"/> Gastrointestinal & Liver Physiology | <input type="checkbox"/> Teaching of Physiology |
| <input type="checkbox"/> Comparative & Evolutionary Physiology | <input type="checkbox"/> Neural Control & Autonomic Regulation | <input type="checkbox"/> Water & Electrolyte Homeostasis |

14. **DO YOU WORK IN INDUSTRY?** YES NO

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Membership Application (Continued...) **Applicant Last Name** (please print) _____

16. OCCUPATIONAL HISTORY [Check if student]

Current Position:

| Dates | Title | Institution | Department | Supervisor |
|-------|-------|-------------|------------|------------|
|-------|-------|-------------|------------|------------|

Prior Positions:

| Dates | Title | Institution | Department | Supervisor |
|-------|-------|-------------|------------|------------|
|-------|-------|-------------|------------|------------|

17. LIST YOUR MOST SIGNIFICANT PUBLICATIONS, WITH EMPHASIS ON THE PAST 5 YEARS (Publications should consist of manuscripts in peer-reviewed journals. List them in the same style as sample below.)

Sample: MacLeod RJ and Hamilton JR. Volume Regulation initiated by Na⁺-nutrient cotransport in isolated mammalian villus enterocytes. Am J Physiol Gastrointest Liver Physiol 280: G26-G33, 1991.

18. DOCTORAL DISSERTATION TITLE (if applicable):

19. POSTDOCTORAL RESEARCH TOPIC (if applicable):

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Mailer Meeting (Which meeting? _____) Colleague Other _____

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