



*Integrating
the Life Sciences
from Molecule to
Organism*

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The Physiologist

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Science and Technology Policy: Past and Prologue A Companion to Science and Engineering Indicators—2000

I. Introduction

Every two years, the National Science Board produces *Science and Engineering Indicators*, a quantitative overview of the US science and technology (S&T) enterprise. Publication of *Science and Engineering Indicators-2000* coincides with the 50th anniversary of the creation of the National Science Foundation (NSF) in 1950. As NSF and the National Science Board prepare to embark on their second half-century, the Board believes it is useful to reflect on the conditions that characterized US science and engineering 50 years ago, on accomplishments and changes, and on directions for the future of the enterprise.

In taking stock of the impacts of science and technology, the Board is moved to comment on the role of policy in S&T—how it is shaped by data, information, and analysis. The process of making choices constitutes the heart of policy-making—determining priorities and investment levels, nurturing long-standing programs, and responding appropriately to emerging research opportunities. Any retelling of US achievements in science and engineering must include policy as “organizing principles” and the arrangements for pursuing them. Together they create the prospects for discovery and application. Inevitably, S&T are among the factors tied to choices made in the strategic allocation of scarce resources.¹

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This paper is also accessible at the NSB web site at <http://www.nsf.gov/nsb/documents>.

II. A Record of Discovery in Science and Technology

“Even economics, in this age of a booming economy, cannot rival the appeal of science and technology as the driving force of history.”

Gertrude Himmelfarb²

A record of research discoveries in science and engineering stands as a legacy of Federal contributions to the life, health, security, and enlightenment of the US citizenry. The innovations driving our economic prosperity have emerged, often unpredictably, from a bedrock of national investments in fundamental research made in years past. The Council on Competitiveness, the US Chamber of Commerce, and the Federal Reserve Board last year all cited S&T research as good for business.³ Evidence mounts that research is a major contributor to US productivity.

In 1971, the first commercial microprocessor was manufactured. Fourteen years later, *Indicators* highlighted instrumentation for advancing knowledge in science and engineering—spectroscopy, lasers, superconductivity, and monoclonal antibodies.⁴ Since then, discoveries, techniques, and refinements abound: materials such as synthetic polymers are used in products ranging from clothing to cars; tools such as the Hubbell and Gemini telescopes explore even beyond our solar system; particle beams probe the structure of matter at distance scales 100 billion times smaller than the size of an atom; and mathematical modeling helps us predict the probability of earthquakes and long-term weather phenomena such as El Nino, test ideas of the nature of matter, study traffic patterns and brain

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Council Meets in Castine

The APS summer Council meeting was held in Castine, Maine, at the Maine Maritime Academy at the invitation of President **Gerald F. DiBona** on July 9-11, 2000. The summer meeting is highlighted by the Council meeting with a majority of the committee chairs, receiving reports on the committees' accomplishments during the past year, and listening to their plans for the coming year. These committee reports are published in this issue of *The Physiologist* (see page 393).

Among the membership issues acted on by Council was the acceptance of the Membership Committee's proposal to no longer be responsible for vetting every membership application. Those applications for which there are no issues will be recommended for Council approval on a monthly basis by APS staff. All others will be referred to the Committee. This will allow the Membership Committee more time to focus on member recruitment and retention efforts. In addition, the Honorary Membership Committee reported to Council that, with the opening of Regular Membership to foreign scien-



APS President, Gerald DiBona, prepares for a lobster feast!

tists, there was no longer a need for the Honorary Membership category. Council agreed and disbanded the Committee but retained the membership category, as there are many Honorary Members who have been elected by the Society over the years.

Award programs to receive Council

attention included the travel award programs for the IUPS 2001 meeting in New Zealand. Although there is already a Travel Award Program for US physiologists, foreign members were not eligible for those grants. Therefore Council approved a Travel Award Program for non-US members to attend the IUPS 2001 meeting in New Zealand (details on the APS Web site: <http://www.the-aps.org>) and another program to allow for physiologists from under-developed countries to attend a Teaching Workshop to be held just before the IUPS meeting. The Postdoctoral Fellowship in Physiological Genomics, which Council agreed had been very successful in attracting many high-quality applications, will now be expanded such that three awards will be given in 2001. In addition, Council approved the Summer Undergraduate Research Fellow Program for another year with the availability of another 12 fellowships for summer 2001. Council also agreed to change the Research Career Enhancement Award deadlines to correspond with those of the Teaching Career Enhancement Award (April 15 and October 15).

With regard to the sections, Council approved their request to double the amount of funding given to each section to facilitate interactions between their Distinguished Lecturers and students at the EB meeting. In addition, APS will cover the cost of registration, at the advance registration level, for the sections' Young Investigator Awardees.

On the international front, the International Physiology Committee has been given the responsibility of coordinating a Latin American Initiative to encourage the scientists in the Latin American countries by supporting courses, symposia, and workshops being held in those countries at which US scientists will present research along with the Latin American physiologists.



Back row: John Hall, Steve Hebert, Barb Goodman, Hector Rasgado-Flores, Thomas Peterson, Mordecai Blaustein, Linda Allen, J.R. Haywood, Jo Rae Wright, Martha O'Donnell. Middle row: Alice Ra'anana, Hannah Carey, Celia Sladek, Gerald DiBona, Doug Eaton, Walter Boron, Judith Neubauer, Phyllis Wise. Front row: Terry Hawk, Bill Chin, Martin Frank, Margaret Reich, Melinda Lowy, Bob Price. Not pictured: Pamela Gunter-Smith, Ed Zambraski, and Marsha Lakes-Matyas.

ogists. The International Physiology Committee was also asked to coordinate the review of all requests for joint scientific meetings with foreign societies. The Committee is working to develop guidelines for the submission of requests and acceptance of invitations.

Council also approved a bylaw change that would allow the Chair of the Section Advisory Committee, currently an ex officio member of Council without vote, to become an ex officio member with vote. The general membership will be asked to vote on this bylaw change at the APS Business Meeting in Orlando in April.

In addition, Council heard of plans for the Publications Pricing Task Force that will be impaneled this fall and made plans for the establishment of the Public Information/Communications Task Force, the Task Force on Sections

and Groups, the Physiological Genomics Task Force, and the Translational Research Task Force. These groups will begin gathering data and holding conference calls to determine the needs of the Society and to develop action plans as called for in the 2000 APS Strategic Plan.

Additional details of the Council's actions during the July meeting will be communicated to the membership at the next APS Business Meeting and can be found in



Celia Sladek, Alice Ra'anana, Phyllis Wise, Hector Rasgado-Flores, Judy Neubauer, Hannah Carey, Terry Oppenorth, J.R. Haywood, Molly Green, and Jo Rae Wright enjoy the sights and sounds of a Harbor Cruise.

the committee reports included in this issue of *The Physiologist*. ❖

The Lost-Luggage Quartet

The APS staff set off for the summer Council meeting in Castine, Maine, on a beautiful Saturday morning with hopes for a wonderful trip—but US Airways had a different idea. After a plane change in Boston to an aircraft that looked like a cigar on steroids, the four travelers arrived in Bangor, ME, only to discover that their luggage did not make the transfer because of weight limits for that particular plane. The indomitable spirits of the APS staff would not be dampened. Upon arrival in Castine, they discovered that other Council members and committee chairs had suffered the same fate and their luggage arrived with only a short delay. So, the four tramped off for the ultimate bonding experience: necessity shopping at Wal-Mart, which included the purchase of the chic Maine t-shirts. After all, the luggage was to arrive Sunday morning. NOT! Nor did it arrive by Sunday after-

noon, Sunday night or Monday morning. It seems all the flights into Castine are the same size and all were full so no extra luggage could fit onboard. Not to mention that US Airways was never sure just where the bags were, despite frequent telephone inquiries by the affected parties. However, Council members, committee chairs, spouses and other staff chipped in and supplied other clothing for those cool and rainy



Melinda Lowy, Bob Price, Margaret Reich, Martin Frank—The Lost-Luggage Quartet.

nights. By Monday morning, the afflicted staff were not in the mood to enjoy the sights and sounds of Maine, feeling the effects of only 2 changes of clothes. At 11 am, the welcome news came that luggage had been sighted in Bangor and was supposedly enroute to Castine. It was with joyous anticipation that the four staff entered their hotel and were told that the rumors were true. After festive reunions and donning of clean garments, it was noted that at least the top layer of articles in each suitcase was wet from the luggage being left on the tarmac for who knows how long. The kind host of the Pentagoet Inn threw a welcome home party for the luggage and provided welcome libations after the experience for all involved. Everyone celebrated at the lobster feast that night. Needless to say, for the trip home, everyone who could keep their luggage as carry-on, did so!

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function, and assess economic and health risks.

A human resource base developed in our institutions of higher learning and employed in all regions and sectors of the US has grown the capacity of the Nation's research workforce. Since 1973, the number of science and engineering researchers receiving support from at least one Federal agency nearly doubled (97 percent).⁵ Add to these federally funded researchers the contributions scientists and engineers make as educators, administrators, managers, and public servants, and the investment in people yields handsomely. Demand for such workers, at all degree levels, is projected to increase well beyond the rate for other occupations.⁶

The 21st century will be known for the melding of our human and science-based infrastructure. The infusion of information technology in our economy is revolutionizing communication as embodied in the Internet and "e-commerce," shrinking the world, creating wealth, and transforming daily routines.

Such impressive research-based capabilities are juxtaposed against a troubling reality: For more than two decades, surveys have shown that American adults have a high level of interest in scientific discoveries, new inventions, and technologies.⁷ Three of four perceive the benefits of scientific research to outweigh its potential harm. But no more than one in five Americans either comprehend or appreciate the value and process of scientific inquiry. While the public's confidence in science is high, for many it is a blind trust. Americans are deeply divided over the development and impact of several important technologies, some of which are discussed below.

The progress of S&T demands more of each of us. One peril is that technical virtuosity distances what most can observe from what a few specially equipped and trained can see and manipulate. Even if we are motivated to

understand the implications of new knowledge, this requires more plain talk about risks as well as benefits and better explanations of why the latest breakthrough matters.⁸ Before citizens will embrace yet another marvel intended to ease, remedy, or otherwise improve life, they deserve information that will inform their thinking.

III. Opportunities for the Ages

"The coming century will impose greater demands and responsibilities on all who have a stake in the discovery and use of knowledge."

National Science Board ⁹

The quest to understand the nature of the atom in the early twentieth century led to a scientific revolution. In overturning conventional thinking, quantum mechanics was discovered. To test this theory, microscopes were devised to study phenomena at scales of atomic size and smaller—much smaller than what is readily observable.¹⁰

In this age of S&T, the challenge to scientists, engineers, and policymakers alike is to generate new ideas and tools that harness research-based knowledge in the fight against human disease and disability, preserve the natural environment, enhance the quality of life, and assure a robust public investment in science and technology. As fields of science, mathematics, and engineering continue to specialize, overarching research themes cross disciplines and, moreover, captivate the public as issues of health, environment, energy, and space.

Areas such as genetics/biotechnology and information technology/telecommunications hold special promise. They are ripe for exploitation because of scientific discoveries made in past centuries and 20th century tools that enable discovery and advance knowledge. For example, the Human Genome Project, launched in 1990 as a distributed "big science" initiative, has historical roots

in the Watson-Crick discovery in 1953 of a double helical structure of the DNA molecule, and the first recombinant DNA techniques (or gene splicing) pioneered by Hamilton Smith and Daniel Nathans in the 1970s. A quarter-century later, Ian Wilmut and Keith Campbell cloned a sheep from adult cells.¹¹

Today, the research environment includes a host of normative ("should we do it?") questions that surround technical capability ("we can do it") with public controversy.¹² For all the inevitable apprehension about the unknown, a newer age of life-enhancing innovations is not far off—biomonitoring devices that provide accurate readouts of our health and sensory prosthetics that synthesize speech, computerize vision, and feed electronic waves directly into the brain.¹³

A separate stream of inquiry in information technology has borne remarkable fruit. The US Department of Defense's Advanced Research Projects Agency created ARPAnet, the precursor to the Internet, to facilitate communication among researchers. The National Science Foundation provided the critical sustenance that delivered this tool to university researchers. Subsequently, the World Wide Web was created to promote rapid data sharing among large collaborations of high energy physicists, a development that both simplified and popularized navigation on the Net. "The idea that anyone in the world can publish information and have it instantly available to anyone else in the world created a revolution that will rank with Gutenberg's . . ."¹⁴

The need to store, share, and interpret vast amounts of data¹⁵ has engendered whole new subfields, such as bioinformatics, which is dedicated to applying information technology (IT) to the understanding of biological systems. To explore the interdependencies among the elements of specific environmental systems will require the development of software, human-computer interaction

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and information management, and high-end computing. Companies use information technology to compete in today's global marketplace by tailoring their products and services to the needs of individual customers, forging closer relationships with their suppliers, and delivering just-in-time training to their employees. If we are to understand and deal with the socioeconomic, ethical, legal, and workforce implications of these systems, we will need to support a research agenda that crosses disciplines, languages, and cultures.

Highlighting technologies that are likely to blossom in the 21st century recalls yesterday's basic research. History instructs that we cannot predict which discoveries or technologies will change the lives of future generations. Rather, fundamental science and engineering research presents long-term opportunities—a high-risk investment with high payoffs.

IV. The Role of Policy

“. . . each new branch of science can open wondrous new opportunities while posing societal challenges that will require vigilance and insightful management.”

Floyd Bloom¹⁶

The future of science and technology will require more wise policy decisions about how to use the Nation's resources to the greatest benefit. Policy is a management tool for nurturing, distributing, and harvesting the creativity of S&T. In choices made daily by decisionmakers in the public and private sectors, Federal policy clasps the invisible hand of the market. The result is an evolving research economy in science and engineering that continues to spur intellectual endeavor, increase participation by those talented and trained, and capture innovations for the public good.

Origins. The progress of science and technology appears so inevitable that the role of policy choices is not often

highlighted. Knowledge may appear to unfold in a “natural” course, but sponsorship, and increasingly stewardship, have played a key role in the 20th century.

With the passage of time, early visions of science for society have come to embody a set of national values and objectives that provide a framework for policy development.¹⁷ Two key policy documents are virtually synonymous with these values: Vannevar Bush's “Report to the President on a Program for Postwar Scientific Research” (subsequently known as *Science—the Endless Frontier*, July 1945), and *Science and Public Policy* (the “Steelman Report,” August 1947). Each report emphasized the bipartisan nature of Federal funding for science and established a core principle that remains among the strengths of the US research system: a strong commitment to partnerships, especially those rooted in the exchange of Federal support of research in universities for the production of knowledge, innovation, and trained personnel for the Nation's workforce.

The Bush Report was not a science policy blueprint. However, it contained the seeds of ideas that have come to be known as “policy-for-science”—issues focused on funding levels, sources, incentives, and priorities for research, and the development and utilization of human resources for science and engineering. In contrast, the Steelman Report encompassed “science-for-policy” issues concerned with the uses of scientific knowledge and capabilities for governance and in the service of the larger society.

The first summary volume of *Science and Public Policy* employed 10-year projections to support recommendations about the resources required to assist the US science and engineering enterprise in addressing national objectives. Significantly, one projection called for a doubling of national R&D expenditures during the succeeding 10 years.¹⁸ This was before the launch of Sputnik and the National Defense

Education Act of 1958, which accelerated a rising national consciousness about S&T careers and science education and ratcheted up the Federal R&D budget.

Revisiting the Origins. As the 20th century came to a close, the United States faced the novel challenge of redefining its goals and priorities in the post-Cold War era. While the importance of science and engineering to the Nation was unquestioned, a clear and uncomplicated rationale rivaling “national security” was lacking. When the “balanced budget” became an overriding priority by 1995, competition for scarce resources grew fierce among claimants to the “discretionary” budget. Long-term investments such as R&D were decidedly vulnerable.

By the mid-1990s, two major Federal policy reports sought to reexamine science policy in a changing economic, political and social context. Both emphasized science in service to society while reaffirming a commitment to university-based research and improved science and mathematics education. The 1994 Clinton-Gore blueprint, *Science in the National Interest*, reiterated the core values that have enabled the Nation to achieve so much through fundamental science—the strength of investigator-initiated research and merit review by expert peers. The report suggested a framework for national science policy organized around five goals deemed essential for the US scientific and engineering enterprise: leadership across the frontiers of scientific knowledge; connections between fundamental research and national goals; partnerships that promote investments in fundamental science and engineering and effective use of physical, human and financial resources; the finest scientists and engineers for the twenty-first century; and scientific and technological literacy of all Americans.¹⁹

A congressional perspective came in the form of a special study in 1998 by the House Committee on Science led by Congressman Vernon Ehlers. *Unlocking Our Future: Toward a New National*

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Science Policy noted that the scientific enterprise needed to “ensure that the well of scientific discovery does not run dry . . . ,” that “discoveries from this well must be drawn continually and applied to the development of new products or processes . . . ,” adding that “education . . . [produces] the diverse array of people who draw from and replenish the well of discovery . . .” and amplifies “the lines of communication between scientists and engineers and the American people.”²⁰

Both reports employed a participatory process, increasing the credibility of subsequent decisionmaking and asserting a continuity of organizing principles tempered by new economic realities: university-based research in a global context; partnerships across disciplines, organizations, and sectors; and public accountability. Each report also acknowledged the indispensability of Federal research investments in a 21st century S&T enterprise shaped by information technology and attuned to societal needs. Predicting that a broad bipartisan consensus would likely continue, the reports warned of funding constraints and the need to establish priorities for Federal support and demonstrate contributions to attaining societal goals.

Finally, like Bush and Steelman, both reports assigned a high priority to human resources as an integral element of science policy. Cultivating an increasingly diverse student body to renew the workforce of a global economy requires quality science education at the K-12 level. Our education system could serve more students far better than it does, especially those in urban and rural areas born into disadvantage. High standards, expectations, and accountability alone cannot rescue schools lacking the resources to support mathematics and science learning to prepare students for the 21st century workforce. This demands well-trained, -equipped, and -rewarded teachers.²¹

Visionary Federal documents issued a half-century apart attest to a consistent

cy of values. The mingling of curiosity and opportunity, largely undirected and fostered in a climate of open exchange, has produced an unparalleled national record of performance and progress in knowledge and innovation.

This legacy has also yielded an irony—times may change, but policy issues remain much the same. Questions persist about the appropriate Federal role in funding the enterprise: How much is enough? What constitutes a strategic balance among problems, disciplines, and levels of funding? As private R&D funding accounts for two-thirds of total national R&D, are investments being skewed toward the short-term, industrial end of the research continuum?

Over 50 years ago, the Bush and the Steelman reports identified fundamental policy values: ample human resources for science and engineering, a vigorous science and engineering infrastructure for research, a robust government-university partnership to advance knowledge in conjunction with education and training, and a symbiosis between fundamental research and national goals. These values endure.

A Changing Federal Role? What, then, should be the Federal role in a global context—one in which multinational corporations influence significant parts of the Nation’s research agenda? How should challenges facing society inform methodologies for priority setting in research? What mechanisms effectively build broad public and scientific support for, and involvement in, the priority setting process? Who is monitoring the incremental growth of the knowledge base and opportunities emerging at the interstices of disciplines? And what education and training are appropriate for producing versatile workers who face a growing diversity of employment prospects and careers? Whatever the responses—policies, programs, and initiatives - the Federal portfolio must be diverse, flexible, and opportunistic, drawing on the creative strengths of many fields and employing a range of organizational

strategies.

While individual serendipity—an aspect of organized science for over 300 years—and collaborations among scientists and engineers (virtually if not physically) grow, the S&T enterprise must adapt to the exigencies imposed by scale, resources, and organizational complexity. Planning and coordination among partners within a framework that is explicitly global must promote collaboration without diminishing the system’s competitive energy. An overarching goal is developing strategies to enhance global scientific communication, international exchanges of students and technical personnel, and databases to sustain research and discovery in the international arena.²²

A sequence of sage decisions made over an expansive period of science and technology has brought us to this point. That is the resounding message of the Federal science policy reports of the last half-century. The current generation of stewards must apply the same ingenuity to endow our social structures with the wisdom of experience and the tools of analysis. This legacy guides the National Science Board in promoting and anticipating the needs of S&T as an institution.²³

Science and Engineering Indicators-2000, like the volumes that have preceded it, can be an anchor for policymakers awash in information and contradictory claims. Just as we accumulate systematic knowledge about the enterprise, Indicators should illuminate signposts to its future. By definition, indicators are retrospective and heuristic, not explanatory. In combination, they may reveal patterns or suggest relationships that call for more intensive analysis. We offer some examples below.

Investments and Returns. While the system of national support of S&T has flourished, Federal funding across disciplines has shifted. “The life sciences now account for more than 50 percent of the US Federal investment in basic research Today’s strong Federal

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support for the life sciences is warranted because biomedical research is on the cusp of a revolution in preventative medicine and treatment. Nevertheless, today's overall research budget is increasingly out of balance."²⁴

When is the Federal R&D portfolio—interagency initiatives as well as agency mission-based programs—diversified too little or too much? How can we tell when basic research seems constricted relative to applied investments? How do management, regulation, and accountability foster inquiry without unduly fettering it?

What has worked in the past could shackle the future. Concern for imbalance among fields and research problems is a challenge to policymakers, as is priority setting, especially when funding lags the pace of discovery and application. R&D, after all, is one national investment among many.

Until recently, the so-called productivity paradox, captured by the maxim “computers are everywhere except the productivity statistics,” dogged investments. Today, the value of information technology is no longer in doubt.²⁵ Experts argue that, in an \$8.8 trillion knowledge-based economy, more than 2.8 percent of the Nation's GDP should be devoted to R&D. In addition, given the extraordinary contributions of fundamental research to long-term economic growth, an investment greater than the 22 percent of the total Federal R&D budget that currently goes to “basic research” seems more than justified.²⁶ Unsettling to many is the declining Federal share of national R&D as industry fuels technology—the promising technologies profiled above and an array of other interdisciplinary specialties.²⁷

Clearly, we are more adept at measuring dollar inputs than outcomes such as peer-reviewed publications, citations, patents, and honorific awards. Capturing the full public return on investments in science and engineering

research remains elusive. Yet *Indicators-2000* helps make sense of a complex enterprise.²⁸ Trends in knowledge production and the Federal stewardship role illustrate two classes of indicator.

Trends in the Globalization of Research. Multiple authorship of the S&T literature, citation patterns by field and country, and patents awarded provide a thumbnail sketch of the global knowledge system. Since 1986, multiple and international coauthorships are on the rise.²⁹ In 1997, the proportion of the world S&T literature published in major international journals accounted for by three countries—the US, Japan, and the UK—represented one-half the total. But the US proportion of the world S&T literature cited from 1990 to 1997 is down in all fields, though we lead the world's research production in health and psychology. Declines in the US share are marked in mathematics, biology, and engineering.³⁰

In sum, the world is catching up. But one wonders whether a falling US share of citations in a field should be regarded as a problem: the US share of world GDP has declined significantly, much to our Nation's advantage. There are more participants in the world publication market and the leaders' share is eroding, while collaboration with researchers around the globe is becoming a routine option.

The proportion of citations on US patents to the US S&T literature decreased from 1987-98 in physics, chemistry, and engineering/technology. Only in biomedicine did citations to US literature increase significantly in patent applications.³¹ An institutional perspective on patenting signals a growth trend. But academic patents still represent only 5 percent, or more than 3000 annually, of all new US-origin patent awards. This is a five-fold increase from 1985, when 111 US academic institutions were awarded patents. In 1998, the number grew to a total of 173 different universities, and the top 100 patenting

universities accounted for over 88 percent of all the patents awarded to academic performers.³² Research universities have become not only incubators of innovation, but also partners in developing and commercializing products that generate income and hold value for other sectors of the Nation's economy.

Payoffs of Federal Stewardship. The Nobel Prize is the most widely-recognized honor conferred for scientific achievement.³³ For the period 1950-95, US citizen and foreign scientists located in American institutions dominate the roster of Nobel laureates. *Indicators-2000* includes an appendix table that lists all Nobel laureates awarded the Prize 1950-99. Data from other agencies are not available, but information on whether the recipients received NSF funding during their career, pre- and post-Nobel, suggests the role played by Federal support in the careers of extraordinary 20th century scientists.³⁴

The findings are striking. The Federal Government has a remarkable record of supporting US Nobel laureates before bestowal of the Prize. Roughly one of three laureates in Physics and Chemistry, and two of five in Economics, successfully competed for NSF research grants. In the aggregate careers of all laureates since 1950, over 40 percent have benefited from NSF support.

So while the Nobel Prize is often discounted as a measure of where science—paradigm-breaking science at that—has been, as opposed to where it is going, the Federal distribution of scarce resources to researchers has repaid the investment in their work many times over.

Taken together, these data reflect a national commitment to science and engineering research. This grand public experiment engendered fields of knowledge not easily visualized a half-century ago. Such government stewardship indicates an oft-overlooked US achievement in science—underwriting risk-taking research programs and investigators

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long before their promise was recognized by the S&T community and hailed by the world.

V. Conclusions

"We should also remember that, like the Internet, super-computers and so many other scientific advances, our ability to read our genetic alphabet grew from decades of research that began with government funding. Every American . . . should be proud of their investment in this and other frontiers of science."

*President William J. Clinton*³⁵

Today we have the ability to manipulate individual atoms and molecules on the scale of one billionth of a meter. This poses myriad possibilities in the way most everything, from medicines to automobile tires, is designed and made.³⁶ By increasing the wonder of science and engineering—a computer chip millions of times as fast as today's Pentium 3 or new methods of removing the smallest contaminants from water and air—we increase hope.

Communicating how things work and why they matter is a continuing challenge. S&T cannot flourish without the visionary use of policy to communicate the joy, fascination, and utility of science and engineering. Indicators can tell us where we have been and suggest where we might be going.

As we celebrate the 50th anniversary of an institution called the National Science Foundation, and reflect on the creative S&T enterprise of which it is a part, we welcome the still-endless frontier that the 21st century holds. We are especially proud to assist, through Indicators, policymakers and government leaders whose decisions will affect the ability of science and engineering to benefit society. That would be a noble achievement beyond this jubilee year.

EHR Subcommittee on Science & Engineering Indicators

Claudia I. Mitchell-Kernan, Chair; John A. Armstrong, Robert M. Solow, Richard A. Tapia, John A. White Bob H. Suzuki, Chair, EHR Committee (ex officio) Daryl E. Chubin, Staff to the Subcommittee

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3. Specifically, the 2 percent per annum growth in productivity observed in the last three years doubled the pace of growth from 1973 to 1995. See Council on Competitiveness. *Going Global: The New Shape of American Innovation* (Washington, DC, September 1998); Progressive Policy Institute. *The New Economy Index: Understanding America's Economic Transformation* (Washington, DC, November 1998); Committee for Economic Development. *Basic Research: Prosperity through Discovery* (New York, NY: CED, 1998); Lester Thurow, *Building Wealth*, *The Atlantic Monthly*, June 1999, pp. 57-69; and President Clinton's Remarks on Science and Technology Investments, California Institute of Technology, Pasadena, CA, Jan. 21, 2000.
4. National Science Board. *Science Indicators-The 1985 Report* (NSB 85-1), ch. 8.
5. National Science Board. *Science and Engineering Indicators-2000*, 2000 (Arlington, VA: National Science Foundation, NSB 00-1), Appendix Table 6-32. Hereafter, this source is abbreviated as *Indicators-2000*.
6. *Indicators-2000*, ch. 3.
7. College graduates and citizens attentive to science and technology policy hold the most positive views. Chapter 8 of *Indicators-2000*, Science and Technology: Public Attitudes and Public Understanding, elaborates on these themes.
8. For example, see NSF GPRP *Strategic Plan, FY 2000-2005*, February 2000 Draft, NSB 00-16.
9. National Science Board. *Toward the Next Century: The State of US Science and*

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10. Achenbach, J. Ingenuity. *Washington Post*, Dec. 31, 1999, p. M12.

11. "Pathways of Discovery," *Science*, vol. 287, Jan. 14, 2000, p. 231. In the view of some, "DNA is likely to be the discovery made in the 20th century that will be the most important to the 21st." See Walter Isaacson, "Who Mattered and Why: The Century of Science and Technology," *Time*, Dec. 31, 1999, p. 54.

12. Even before the cloning of "Dolly," questions were raised about who will own the map of the human genome, what are the limits to privacy in gene therapy, and what is the safety-profitability tradeoff in genetically-modified foods. All illustrate the "slippery slope" that policy must confront. For example, an executive order now prohibits Federal agencies from using genetic testing in any employment decision. Remarks by the President on Genetic Discrimination, American Association for the Advancement of Science, Washington, D.C., February 8, 2000.

13. Smith, D. The Millennium Baby. *Washington Post*, Jan. 1, 2000, pp. A10-A11.

14. Isaacson, op.cit., note 11, p. 57, notes that "Just as the flow of ideas wrought by Gutenberg led to the rise of individual rights, so too did the unfetterable flow of ideas wrought by telephones, faxes, television and the Internet serve as the surest foe of totalitarianism in this century." But concern continues to grow in the US over the "digital divide"—the gap between those who have access, at home and in school, to IT hardware and software and those who do not. Chapters 8 and 9 of *Indicators-2000* explore evidence of this gap.

15. See NSB Statement on the Sharing of Research Data, NSB 99-24, Feb. 18, 1999.

16. Bloom, F. E. The Endless Pathways of Discovery. *Science*, vol. 287:229, January 14, 2000.

17. The following discussion is indebted to Chapter 1 of *Indicators-2000*, Science and Technology in Times of Transition: The 1940s and 1990s.

18. Steelman, J. R. *Science and Public Policy*, vol. I (New York: Arno Press, reprinted from 1947), pp. 13, 26.

19. Clinton, W. J. and Gore, A. *Science in the National Interest*, Executive Office of the President, August 1993, p. 7.

20. Committee on Science, US House of

Science and Technology Policy: Past and Prologue

Representatives. *Unlocking Our Future: Toward a New National Science Policy*, 105th Congress, Committee Print 105-B:12, September 1998.

21. These and related human resource issues are discussed in the Board's report, *Preparing Our Children: Math and Science Education in the National Interest*, NSB 99-31, March 1999.

22. An NSB Symposium on International Models for S&T Budget Coordination and Priority Setting, in November 1999, examined decision making models in industrialized, centralized, and developing nations. Also see Committee on Science, Engineering, and Public Policy. *Capitalizing on Investments in Science and Technology* (Washington, DC: National Academy Press, 1999); and Lewis M. Branscomb and James H. Keller, eds., *Investing in Innovation: Creating a Research and Innovation Policy That Works* (Cambridge, MA: MIT Press, 1998).

23. National Science Board. National Science Foundation. *Science at the Bicentennial: A Report from the Research Community* (Washington, DC: US GPO, Apr. 30, 1976), ch. 1. The Board is currently grappling with methodologies for coordination and priority-setting in the Federal science and engineering research budget. See Charge to the Ad Hoc Committee on Strategic Science and Engineering Policy Issues, Mar. 23, 1999, NSB 99-56.

24. Smith, P. M. Life Sciences' Stewardship of Science. *Science*, 286:2448 December 24, 1999.

25. In the view of *Business Week's* economics editor, "In the 1990s, at least, it seems that technology is more powerful than either taxes or deficits. No one is saying that the

three are mutually exclusive. Lower interest rates from increased savings can encourage innovation. So can lower tax rates." Michael J. Mandel, "How Most Economists Missed the Boat," *Business Week*, Nov. 15, 1999, pp. 106.

26. Note that the US investment, which includes both military and civilian expenditures, is second in percentage terms only to Japan (whose R&D investment is all civilian). For national funding data, see the AAAS R&D Budget and Policy Program website, www.aaas.org/spp/dspp/rd/rdwwwpg.htm.

27. Congress has extended the Research and Experimentation tax credit for an unprecedented five-year period. See President Clinton Highlights Progress toward Building a High-Tech, High-Wage Economy, White House Press Release, Dec. 3, 1999. But the President's Information Technology Advisory Committee (PITAC), *Interim Report to the President* (Arlington, VA: National Coordination Office for Computing, Information, and Communications, August 1998), has warned that the Federal investment in IT is inadequate and "threatens to interrupt the flow of ideas that has driven the information economy in this decade" (p. 3).

28. Also see National Research Council, *Measuring the Science and Engineering Enterprise* (Washington, DC: National Academy Press, 2000).

29. *Indicators-2000*, Appendix Table 6-60. If coauthors from different countries are considered, the US proportion grows 9.8 percent, Japan 7.1 percent, and the UK 12.6 percent.

30. *Indicators-2000*, Appendix Tables 6-56 and 6-63.

31. *Indicators-2000*, Appendix Table 6-65. However, articles resulting from "public research"—that performed in academic, nonprofit, and government research organizations, and funded primarily by Federal sources—are increasingly cited in US patent applications. See National Science Board Working Paper, *Industry Trends in Research Support and Links to Public Research* (Arlington, VA: NSF, 1998, NSB 98-99).

32. *Indicators-2000*, pp. 6-84 to 6-87 and Appendix Table 6-67.

33. Of course, the Nobel Prize is given for only a subset of scientific fields. Omissions include fields such as information science and technology that did not exist at the time when the Nobel was established. For all fields in which the Nobel Prize is awarded, US-based scientists represent two-thirds of the laureates, ranging from 54 percent in Chemistry to 77 percent in Economics. These tabulations are derived from the "Nationality or Citizenship Index" in Bernard S. Schlessinger and June H. Schlessinger, eds., *The Who's Who of Nobel Prize Winners 1901-1995* (Oryz Press, 1996), pp. 243-244.

34. *Indicators-2000*, Appendix Table 1-1. The prize was adopted as the unit of analysis, with multiple winners increasing the likelihood that at least one will have had NSF support. Laureates from foreign countries, of course, would be less likely to apply for US funds.

35. Remarks by President Clinton at the National Medal of Science Award Ceremony, Mar. 14, 2000.

36. See President Clinton Fact Sheet on National Nanotechnology Initiative, Jan. 21, 2000.

EB 2001 Deadlines

November 6, 2000

Deadline for Electronic Receipt of abstract

December 8, 2000

Deadline for withdrawal of abstract

February 5, 2001

Deadline for EB 2001 Advance Registration

February 21, 2001

Last date for hotel reservation

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Committee Reports

Animal Care and Experimentation Committee



The Animal Care and Experimentation Committee (ACEC) continues to keep its eye on proposed changes to the Animal Welfare Act (AWA) regulations, which would have a significant impact on Society members. One main issue is a proposed change in the reporting of pain and distress in the report that all US Department of Agriculture (USDA) registered facilities

must complete and forward to the USDA annually. There are three main categories under which animals are currently reported. These include animals that undergo little or no pain or distress, animals that may perceive pain and distress but which are relieved by drugs, and animals that undergo painful procedures that, for scientific purposes, do not receive pain-relieving drugs. The USDA is formulating a change to this system in response to a request by The Humane Society of the United States (HSUS). The HSUS has begun an initiative to eliminate pain and distress in laboratory animals by the year 2020. It is the contention of HSUS that the current reporting requirements do not provide enough information to determine the numbers of animals that undergo pain and distress. The current reporting system is certainly confusing, as different institutions will place identical procedures under different reporting categories. However, increasing the complexity of an already faulty reporting system will supply inaccurate data and lead to excessive costs in time and effort without enhancing animal welfare. The ACEC will continue to keep you informed on this issue and will respond to the proposed changes once they are published in the Federal Register.

Another important issue that is under consideration by the USDA is the inclusion of rats, mice and birds under the definition of “animal” in the AWA regulations. The USDA received responses from the public in response to a petition from the Alternatives Research and Development Foundation. In May 1999, Walter Boron, then APS president, responded to the USDA that this would be a redundant regulation because these animals are covered under the *ILAR Guide for the Care and Use of Laboratory Animals* (all Public Health Service-funded institutions must abide by the Guide). Thus inclusion of these animals under the AWA would serve to increase paperwork and inspection requirements without enhancing animal welfare. The USDA has not indicated what it intends to do, but the decision may in fact be made by the courts because several animal activist groups filed suit to compel

USDA to cover rats, mice, and birds under the AWA. Again, the ACEC will closely follow developments in this area.

A few years ago the ACEC and Public Affairs Committee recommended to Council that APS participate in the AAAS Mass Media Fellow. This is our third year of participation, and is the second time we have had successful applicants. **Susan Rainey** is the 2000 APS-AAAS Mass Media Fellow. She has a BSc in physiology from McGill University and an MSc in physiology from the University of Toronto. She is currently working on her PhD in molecular physiology at the University of Toronto and will spend this summer working in the New York offices of *Newsweek*. Two other APS student members have also been accepted as AAAS Mass Media Fellows. They are **Kendall Powell** and **Pamela Hanson**. Powell expects to receive her PhD in cell biology from UCSD in 2002. She will work at the *Los Angeles Times* this summer. Hanson expects to receive her PhD in Biochemistry, Cell and Developmental Biology from Emory University in 2001. She will spend the summer working for *The Chicago Tribune*. All three fellows have agreed to write articles about their Mass Media fellowship experiences for *The Physiologist* this fall. We look forward to seeing a review of their experiences in the program.

Several times a year, the APS is alerted to discussions within institutions about whether or not to continue using animal laboratories in medical, veterinary, or graduate education. The APS is on record in support of animal teaching exercises, and can provide information as well as support letters if needed. The APS policy is as follows:

The Use of Animals is Necessary for the Proper Teaching of Students of the Biomedical Sciences

The American Physiological Society believes the use of animals is important in the education of students in the biomedical sciences, including medical students. The use of animals gives the student a direct understanding of how living systems work, an understanding that cannot be gained by reading a textbook, watching a video, or using a computer. To achieve the best biomedical education, students must have a complete learning experience including the use of laboratory animals. ❖

C. Terrance Hawk, Chair

- Council accepted the report of the Animal Care and Experimentation Committee.
- Council approved a proposed change in wording to the “APS Guiding Principles for the Care and Use of Animals” to clarify the usage of the words analgesia and anesthesia.
- Council approved a motion to make a \$1,000 donation in the memory of former President Walter B. Cannon to the American College of Laboratory Animal Medicine Foundation.

Committee Reports

Awards Committee



This year the Awards Committee met on several occasions by conference call in order to review applications and nominations for five different awards: the APS Postdoctoral Fellowship Award in Physiological Genomics, the Research Career Enhancement Award, the Arthur C. Guyton Award for Excellence in Integrative

Physiology, the Shih-Chun Wang Young Investigator Award and the Lazaro J. Mandel Young Investigator Award. There were no applications received for the Teaching Career Enhancement Award.

This year there were 27 applications for the Postdoctoral Fellowship Award in Physiological Genomics, continuing the trend of this award being very competitive. Three committee members reviewed each application and the six highest-rated applications then underwent a second review by all eight members of the committee. Although the award guidelines state that only the top two rated applications can be funded, the second and third ranked applications had almost the same review score. As such, the committee recommended and the APS Council approved funding three applications this year. These awardees are **Bradley J. Merrill** from the University of Chicago, **Biao B. Sun** from Harvard Medical School, and **Frank van Breukelen** from the University of Colorado Health Sciences Center.

The two cycles of applications for the Research Career Enhancement Awards attracted six applications. The following individuals were recommended for funding: **Thomas A. Davis**, Loras College in Dubuque, Iowa; **Hirofumi Tanaka**, University of Colorado; **Vera A. Golovina**, University of Maryland; **Leslie C. McKinney**, Uniform Services University of the Medical Sciences; and **John D. Symons**, University of California at Davis.

The Arthur C. Guyton Award for Excellence in Integrative Physiology was established in 1993. It is awarded to an investigator who holds an academic rank no higher than Assistant Professor and has demonstrated outstanding promise in research that utilizes quantitative and integrative approaches and feedback control system theory for the study of physiological function. This year there were six applicants for the award. The Committee recommended that the awardee be **Jeffrey M. Hausdorff** from Beth Israel Deaconess Medical Center, Harvard Medical School.

There were five applications this year for the Shih-Chun

Wang Award. This award, established in 1998, is awarded to an investigator with academic rank no higher than Assistant Professor who has demonstrated outstanding promise in research in any area of the physiological sciences. The Committee recommended that this year's awardee be **Peter J. Havel**, University of California at Davis.

Last year, the Lazaro J. Mandel Young Investigator Award was established in memory of Mandel, Professor of Physiology at Duke University. The award is to be given to an individual demonstrating outstanding promise in the research area of epithelial or renal physiology. Similar to the Guyton and Wang awards, the awardee must hold an academic rank no higher than Assistant Professor. The Committee reviewed one application for this award and it was recommended for Council's approval. The first recipient of the Mandel Award is **Iskander I. Ismailov**, University of Alabama at Birmingham.

Thomas V. Peterson, Chair

- Council accepted the report of the Awards Committee.
- Council approved an increase in the number of Postdoctoral Fellowships in Physiological Genomics from two to three awards per year and voted to require that the postdoctoral fellowship awardees use the supplemental money given as part of the award to attend the Experimental Biology meeting during the first year of the fellowship and to present data at that meeting during the second year of the fellowship.
- Council approved a change in the application deadlines for the Research Career Enhancement Awards to April 15 and October 15 to match those of the Teaching Career Enhancement Awards.
- Council approved a request to have the APS central office maintain and coordinate a registry of all awards.
- Council urged that the sections be encouraged to use defined criteria for awards, which means all sections will have competition for their awards.

Career Opportunities in Physiology Committee



At the recent EB meeting in San Diego the Career Opportunities in Physiology Committee sponsored a Careers Symposium entitled "Diverse Opportunities in Physiology and Redirecting One's Career." Approximately 130 individuals attended and received a sit-down lunch. Four professionals gave an overview of their positions and responsibilities. By design,

Committee Reports

each of these persons was unique in that they also made a career change within the last three to five years. Consequently, in addition to describing their present position, they were also able to share their experience, suggestions, and guidance in terms of how they went about making the career change. The session was very well received. Next year the Committee intends to organize a similar symposium. To accommodate a greater number of people, tentative plans are to have a late-afternoon session, perhaps along with a wine and cheese social.

The APS Summer Undergraduate Research Fellowship Program, which was inaugurated last year, funded 12 Fellowships. All of these Fellowship recipients were rated as being outstanding-excellent. The purpose of this program is to expose talented undergraduates to basic physiological research. All of these awardees completed their research experiences during the summer of 2000. Feedback that the Committee has received concerning this program, from both mentors and awardees, has been extremely positive. The Committee is looking forward to continuing this Fellowship program next year.

The "Careers in Physiology" poster has been redesigned and is ready for distribution. The Careers Committee is in the process of updating the APS Careers Brochure. Also, the Committee is developing Power Point slide presentations/files on the topics of "Careers in Physiology" and "Animal Use in Research." When these presentations are complete, APS members will be able to download these files from the APS web page for their own use. ❖

Edward J. Zambraski, Chair

- Council accepted the report of the Career Opportunities in Physiology Committee.
- Council approved holding an open career session at EB 2001, preferably at the end of the day to eliminate conflict with scientific sessions.
- Council approved the continuation of the Summer Undergraduate Research Fellowship Program for 2001 and agreed to fund another 12 fellowships.



Committee On Committees

The Committee on Committees is composed of representatives from each of the 12 Society Sections and two Councillors. The section representatives are elected by the steering committee of the section.

The primary duty of the Committee is to nominate individuals to fill vacancies

on the other APS standing committees. This year the committee recommended individuals to fill the following vacancies:

Animal Care Committee	2 (2)*
Awards Committee	5 (3)
Career Opportunities in Physiology	4 (2)
Ray G. Daggs Award Committee	1 (1)
Education Committee	4 (2)
Finance Committee	1 (2)
Honorary Membership Committee	1 (1)
International Physiology Committee	1 (2)
Long Range Planning Committee	2 (3)
Membership Committee	1 (2)
Perkins Memorial Fellowship	3 (2)
Porter Physiology Development	3 (4)
Public Affairs Committee	3 (2)
Publications Committee	1 (3)
Senior Physiologists Committee	2 (3)
Women in Physiology Committee	1 (3)

*The vacancies projected for each committee for next year are shown in parentheses above. Active member participation in this process is encouraged. Please submit nominations to your section or directly to APS.

The committee also recommended individuals to fill vacancies on the Council of Academic Societies of AAMC and on one FASEB committee.

The APS members nominated to fill vacancies had the following sectional affiliation: Cardiovascular Section, 7; Cell & Molecular Physiology Section, 6; Central Nervous System Section, 1; Comparative Physiology Section, 1; Endocrinology & Metabolism Section, 0; Environmental & Exercise Physiology Section, 2; Gastrointestinal Section, 2; Neural Control & Autonomic Regulation Section, 6; Renal Section, 3; Respiration Section, 0; Teaching of Physiology Section, 1; Water & Electrolyte Homeostasis Section, 6.

There were 11 members less than 45 years of age nominated for committee vacancies and 11 women nominated.

The process by which the Committee on Committees identifies appropriate nominees for these committees begins in the fall with solicitation of nominees from each APS section, chairs of Departments of Physiology, current committee chairs, APS Council, and the general membership. These nominations are due at the APS office in January. During February and March the members of the Committee on Committees prepare initial slates of candidates. Selection is based on an individual's qualification for a specific committee. Section affiliation, gender, and minority or junior investigator status are given serious consideration in order to broaden membership representation on each committee. The committee meets at the Experimental Biology meeting to finalize recommendations that are presented for approval by the APS Council at their summer meeting. Approved nominees begin their term of appointment in January. ❖

Phyllis M. Wise, Chair

Committee Reports

- Council accepted the report of the Committee on Committees.
- Council approved the slate of nominees for committee vacancies with minor exceptions.

Education Committee



The annual workshop on physiology for life science teachers and students (inviting local high school teachers and some of their students to Experimental Biology) organized by Committee member **Cheryl Heesch** and the Education Office was held at EB 2000 in San Diego. The keynote address was given by Jeffrey Graham on “Understanding

How Charlie Does it: Hot Tuna and Cool Physiology.” Committee member **George Blevins**, graduate student **Stephania Miller**, and APS member **Alice Villalobos** talked about their careers in physiology. Numerous APS members volunteered to be luncheon hosts and tour guides for small groups of teachers and students. During the afternoon sessions, teachers used original curricula written by our summer research teachers and learned about the APS programs and resources for K-12 teachers. Students participated in the discovery-based activities from the local outreach team curriculum on blood flow (the Elvis Experiments for “deriving” Poiseuille’s Law). **Barb Goodman** assisted the students in the design and implementation of their experiments and the preparation of posters reporting their results.

The Education Committee and the Teaching of Physiology Section cosponsored a featured topic for EB 2000 entitled “Medical Physiology Instructional Resources” organized by Barb Goodman. The purpose was to highlight the instructional resources for medical school faculty available through APS. **Rob Carroll** described the purpose, method, and results of the Medical Physiology Core Curriculum Objectives that he co-wrote with the Association of Chairs of Departments of Physiology. Committee member **John Dietz** explained the history and evolution of the Education Committee’s Archives of Teaching Resources and demonstrated how to use its cases. Editor **Penny Hansen** demonstrated how to do an extensive search of *Advances in Physiology Education* when developing or updating lectures and activities in medical physiology. Goodman summarized the resources available and solicited both additional resources and feedback from those in attendance. All APS members are encouraged to use and submit material for the evolving and expanding Archives of Teaching Resources.

The Frontiers in Physiology program is continuing with its highly successful Summer Research Teacher (SRT) component for K-12 teachers to work in the laboratory of an APS member. Each SRT also attends a weeklong summer institute in which they receive more in-depth content exposure, practice specialized teaching techniques, and develop specific, hands-on, inquiry-based science activities for use in their classrooms. APS members who volunteered to attend the 1999 institute as “physiologists in residence” included George Blevins and Barb Goodman. The teachers from both the 1999 SRT program and the 1999 Explorations in Biomedicine—Engaging Native Americans in Research program were in attendance at EB 2000 and enjoyed observing and presenting at a scientific meeting, and renewing friendships. They also shared their original curricula with the teachers in attendance with the Physiology for Life Science Teachers and Students day.

Frontiers in Physiology includes the Local Outreach Team program, in which APS members and educators learn or develop curricular units on discovery-based approaches for use by middle and high school teachers. Existing Local Outreach Teams are developing and field-testing six new curricular units. At the Local Outreach Team reception, the new aspects of the program for 2000 and beyond were described. Existing Local Outreach Teams will be offered the opportunity for additional funding by bringing in a team from another location to train them in the new curricular units. A three-year external evaluation of the Frontiers program will be completed next year. The NIH Science Education Partnership Award program intends to fund the Frontiers program for an additional three years.

The Education Office sponsored another annual retreat for Montana Life Science Educators in September 1999 entitled “Native American Issues for Science Education and Research.” Committee member **George Blevins** assisted with the retreat which featured a diet analysis activity, a blood glucose activity, an internet activity on a web-based learning module about diabetes among Native Americans, information about APS programs and resources, presentations on diabetes by **Michael Pagliassotti**, and small group discussions with career information by physiologists Blevins, **Joe Coulter**, Pagliassotti, and **John Stallone**. The evaluations of the retreat were very positive. A three-year retrospective external evaluation about the impact of this program in Montana classrooms will be completed next year. The MARC Ancillary Training Activity Grant program intends to fund the Explorations program in Montana for an additional three years.

The Education Committee sponsored another well-attended refresher course entitled “Integrating Molecular Biology into the Physiology Curriculum” at EB 2000 in San Diego, CA. This unique refresher course was organized by outgoing

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Committee member **Jim Schadt** and member **Andy Lechner**. The more than 100 people in attendance at the session were impressed by how well the three talks were coordinated to make a complete story. Elmer Price emphasized background, terminology, and molecular techniques in his presentation "Molecules Mediate Physiology Channel Structure-Function." **Leslie Leinwand** described the usefulness of molecular biology for her research with an emphasis on site-directed mutagenesis and expression systems in her presentation "Genetic Manipulation of Muscle and its Impact on Function." **Jeffrey Robbins** summarized by emphasizing transgenic and gene knock-out models in his presentation "Gain- and Loss-of-Function Studies—A Physiological Approach." A refresher course entitled "Endocrinology in Modern Medical Curricula" is being organized for EB 2001.

Physiology Insights is a program for undergraduate life science faculty and instructors at two- and four-year colleges. The Education Office offered a Physiology Insights workshop during the early part of EB 2000. Twenty faculty members from institutions in the San Diego area and throughout the US used a grant-sponsored fellowship to participate in sessions in content, teaching, and funding opportunity at EB. Fellows also participated in Education Committee and Teaching of Physiology Section sponsored activities including the section dinner. Special activities for the undergraduate faculty included a hands-on teaching session featuring the Elvis experiments with APS members **Mary Anne Rokitka** and **Dee Silverthorn** and a presentation on how to create an interactive lecture by Silverthorn. There will be four additional Physiology Insights workshops offered during the next year including one in conjunction with the Human Anatomy and Physiology Society (HAPS) meeting.

APS and HAPS members Silverthorn and **Dan Lemons** obtained proof-of-concept funding from the NSF's Course, Curriculum and Laboratory Improvement (CCLI) Program to develop active learning materials for physiology and functional anatomy. The grant facilitated a planning meeting of some APS and HAPS members during EB 2000 for a new curricular unit to be presented at the June 2000 HAPS meeting. The unit is entitled "Gradients and Conductances: What Flows Where and Why?" The presentations at HAPS will include symposia on cardiovascular, respiratory, and renal pressure-flow relationships by APS members **Rob Carroll** and Goodman and workshops by APS members Rokitka, Penny Hansen, Harold Modell, Carroll, Joel Michael, Lemons, and Silverthorn. ❖

Barbara E. Goodman, Chair

- Council accepted the report of the Education Committee.
- Council allocated the requested funds for the continuation of the summer research fellowship program.
- Council approved an increase in the size of the Education Committee to 12 members.

Finance Committee Report



During the Spring meeting of Council, the Finance Committee chair reported that the Society continues to be financially sound and enjoys substantial financial growth through prudent investment practices. The Society uses up to 4% of the value of its investments annually as operating income. Only that amount required to balance the budget is withdrawn; the

remainder continues in actively managed investment accounts.

The chair reviewed the 1999 budget versus actual income and expenses and presented the modified 2000 budget based on the 1999 actual figures. The Society employs a consolidated operating budget to manage overall operations. The consolidated budget is comprised of the individual budgets for the various cost centers; these include publications, membership services, education, public affairs, marketing, and the executive and business offices. For 1999, the year ended with income of \$14,843,176 (including \$110,026 used from the allocation of 4% of the managed accounts to balance the budget) and expenses of \$12,266,083 plus general and administrative (G&A) costs of \$1,335,050, for total expenses of \$13,601,133. G&A costs (the sum of executive and business office expenses) are allocated to other Society offices based on each office's share of total salary expenses. Including the \$110,026 investment allocation, total operating revenue exceeded total operating expenses, resulting in an increase in net assets of \$1,242,043. APS invests its liquid assets in short- and long-term investments according to policies set forth by the Council.

The Council approved a 2000 budget of \$15,186,132. To achieve a balanced budget, the entire investment allocation of \$1,201,438 from the managed accounts is needed, plus an additional \$223,721 from excess Publications revenue, which is expected to total \$1,023,599. Including the investment allocation, total APS operating revenue (\$15,986,010) is expected to exceed total operating expenses resulting in a \$799,878 increase in net assets.

The Finance Committee will be reviewing a three- to five-year forecast of APS operations in order to identify possible trends in the revenue and expenses of APS. The forecast will be coordinated with work being done by the publications Pricing Task Force.

Council reviewed the publications and finance committees' recommendations for 2001 journal subscription prices. It

Committee Reports

should be pointed out that journal publication is the major source of revenue for the Society and is key to our financial well being. Members are charged at a reduced rate and most of the profitability is derived from sale of subscriptions to institutions.

The Finance Committee recommended that subscription prices be raised by an overall rate of 7.5%. An additional 2% increase was recommended for *Physiological Reviews (PRV)* in response to the Publications Committee's desire to increase the number of pages for *PRV*. Foreign subscribers will also be required to cover a portion of the cost of expedited mailing to their institutions.

The 2001 domestic institutional prices are as follows (with percentage increase in parenthesis): *American Journal of Physiology*, \$2,570 (8.7%); *Journal of Neurophysiology*, \$950 (11.7%); *Journal of Applied Physiology*, \$835 (5.6%); *Physiological Reviews*, \$315 (6.2%); *AJP:Cell Physiology*, \$480 (5.9%); *AJP:Endocrinology and Metabolism*, \$335 (8.4%); *AJP:Gastrointestinal and Liver Physiology*, \$360 (9.4%); *AJP:Lung Cellular and Molecular Physiology*, \$325 (12.0%); *AJP:Heart and Circulatory Physiology*, \$665 (9.0%); *AJP:Regulatory, Integrative and Comparative Physiology*, \$460 (5.5%); *AJP:Renal Physiology*, \$335 (6.6%); *Advances in Physiology Education*, \$35 (25.0%); *News in Physiological Sciences*, \$160 (12.9%); *The Physiologist*, \$70 (12.9%); and *Physiological Genomics*, \$200 (no change).

Nonmember individual subscription prices will be set at 2/3 of the domestic institutional price. Member prices, which

have not increased since 1998, will be increased by the same percentage as the 2001 domestic institutional prices. Print subscriptions include online access to the journals, and members can access the entire online collection for \$49.50. It was recommended that the online only institutional subscription remain at 90% of the print and online prices.

The Finance Committee reviews the performance of its four managers of our investment accounts through the consultative services of Smith Barney. As of December 31, 1999, the accounts had the following market values: Operating Reserve Investment Account I \$8,969,662, Operating Reserve Investment Account II \$12,163,611, Publication Contingency and Reserve Account \$9,204,223, Second Century Program Fund \$2,923,860, Caroline tum Suden Account \$763,123, IUPS Account \$539,119, Perkins Memorial Fund \$397,751, Giles F. Filley Memorial Fund \$1,130,958, Shih-Chun Wang Fund \$182,580, Guyton Fund \$291,843, and the Lazaro Mandel Fund \$96,104. The return for the entire fund was 10.00% for the year ended December 31, 1999. The return on equities for 1999 was 21.66%, and the return on fixed income investments was -2.95%. The total fund market value at December 31, 1999 was \$36,862,834.

The Finance Committee received the annual audit performed by PricewaterhouseCoopers, LLP. In the opinion of the auditors, based on generally accepted accounting principles, the financial statements shown below fairly represent the financial position of the Society as of December 31, 1999.

Mordecai P. Blaustein, Chair

- Council accepted the report of the Finance Committee.

APS Statement of Financial Position as of December 31, 1999

ASSETS

Cash and cash equivalents	\$ 4,187,953
Investments (net)	40,094,592
Accounts receivable	1,535,828
Accrued interest receivable	250,335
Advances to section editors	218,927
Prepaid expenses	132,907
Furniture, fixtures, and equipment	<u>130,528</u>
Total assets	<u>\$46,551,070</u>

LIABILITIES

Accounts payable and accrued expenses	871,359
Amount held for custodial funds	79,147
Unearned revenue	
Subscriptions	6,628,485
Dues and other	<u>255,939</u>
Total liabilities	<u>\$ 7,834,930</u>

NET ASSETS

Unrestricted	\$37,644,419
Temporarily restricted	1,059,221
Permanently restricted	<u>12,500</u>
Total net assets	<u>38,716,140</u>
Total liabilities and net assets	<u>\$46,551,070</u>

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APS Statement of Activities for the year ended December 31, 1999

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Operating Revenue:				
Subscriptions—print	\$ 8,333,891	\$	\$	\$ 8,333,891
Subscriptions—online	145,953			145,953
Advertising and page charges	1,977,963			1,977,963
Reprints, single and back issues	1,113,709			1,113,709
Grants and contracts	757,962			757,962
Conferences and meetings	545,771			545,771
Membership dues	335,325			335,325
Contributions	108,586	198,521		307,107
Manuscript handling fees	275,350			275,350
Other income	143,349			143,349
Net assets released from restrictions	214,348	(214,348)		
Total operating revenue	<u>\$13,952,207</u>	<u>\$ (15,827)</u>	<u> </u>	<u>\$13,936,380</u>
Operating Expenses:				
Publications	10,780,254			10,780,254
Society general	1,457,896			1,457,896
Education	216,847			216,847
Marketing	179,618			179,618
Society programs	<u>924,250</u>			924,250
Total operating expenses	<u>13,558,865</u>	<u> </u>	<u> </u>	<u>13,558,865</u>
Operating change in net assets	393,342	(15,827)		377,515
Net realized gains on investments	2,695,264			2,695,264
Net unrealized gains/(losses) on investments	(649,835)			(649,835)
Interest and dividends	1,437,216	57,861		1,495,077
Less: Investment management fees	<u>(460,713)</u>	<u> </u>	<u> </u>	<u>(460,713)</u>
Change in net assets	3,415,274	42,034		3,457,308
Net assets, beginning of year	<u>34,229,145</u>	<u>1,017,187</u>	<u>12,500</u>	<u>35,258,832</u>
Net assets, end of year	<u>\$37,644,419</u>	<u>\$ 1,059,221</u>	<u>\$ 12,500</u>	<u>\$38,716,140</u>

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Honorary Membership Committee



The Honorary Membership Committee met via conference call to address the question of whether or not the Honorary Membership category was appropriate now that the Society had become inclusive. In the past, Honorary Membership was accorded to foreign physiologists who were not eligible for Regular Membership.

The Committee agreed that the category had become redundant by the change in Bylaws to allow foreign physiologists to become Regular Members. It was also noted that when Honorary Members were selected, it was based on the recommendation of the Committee, not as a result of a call for nominees from the membership. The Committee did not believe that the category should be broadened to include physiologists residing in the United States.

Prior to deciding whether or not to retain the Honorary Membership category, the Committee reviewed the bylaws of the FASEB societies that publish their bylaws in the FASEB Directory. Of the 14 societies with published bylaws, only six societies have an Honorary Membership category. While each of the above societies seeks to recognize distinguished scientists, most of them restrict Honorary Membership to individuals who are not currently members of the Society. This restriction is not part of the APS bylaw on Honorary Membership.

The Honorary Membership Committee therefore recommended that the Honorary Membership category be eliminated. Current Honorary Members would retain their status but no new Honorary Members would be selected. ❖

Franklyn G. Knox, Chair

- Council accepted the report of the Honorary Membership Committee.
- Council voted to cease electing individuals to Honorary Membership and to disband the Honorary Membership Committee.

International Physiology Committee



The International Physiology Committee (IPC) met during the Experimental Biology 2000 meeting to discuss the future direction of the Committee. Councillor **Douglas Eaton** was appointed by Council to serve as a link between the Council and the IPC.

APS sponsors numerous joint meetings with sister international societies.

However, until now these activities were coordinated by Council as they arose. With the continued increase in the number of invitations to participate in joint meetings and the concern of the appearance of conflicts of interest on the part of members of Council, it was decided that the IPC would be entrusted with acting as the coordinating body.

The new duties of the IPC will include 1) coordinating all the international activities sponsored by the APS; 2) implementing the "Latin-American Initiative" (see below); and 3) strengthening the ties between the IPC and the International Union of Physiological Societies (IUPS).

To accomplish the goal of coordinating all international activities, the IPC was asked to develop a comprehensive plan to prioritize all projects and requests for joint meetings and activities between the APS and all other international physiological societies. All joint meeting proposals will be sent to the IPC for analysis and prioritization. Subsequently, the IPC will send to Council its recommendations for approval.

The "Latin-American Initiative" project was approved by Council last year and is now being implemented. This Initiative has the following objectives: 1) to support meetings and courses in Latin America, 2) to offer free online subscriptions of APS publications to Educational Institutions in Latin America, 3) to support the travel expenses of Latin-American students and APS members to attend the annual Experimental Biology meeting, and 4) to organize joint meetings between the APS and our sister physiological societies in Latin America. The first symposium supported under the Latin-American Initiative is entitled: "Paracrine, Cytokine and Hormonal Factors Involved in Cardiac Function and Remodeling" and is organized by Rafael Rubio. This symposium will take place during the Latin-American Physiological Society meeting in Cancun, Mexico in September 2000. It was decided that proposals for future symposia and courses should be submitted for consideration by the IPC via the APS home page. The address is: http://www.the-aps.org/news/nws_ltn_amer_init.htm. The criteria for selection of the pro-

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posals is the following: quality of the course/symposium, experience of the organizers, number of people that will benefit from the sponsored activity, and resources provided by the host institution including available additional funds.

The IPC was asked to suggest means by which it could get more involved with the IUPS. It is suggested that the IPC could help in selecting the APS representatives to the US National Committee for IUPS and that these representatives should report to the IPC. ❖

Hector Rasgado-Flores, Chair

- Council accepted the report of the International Physiology Committee.
- Council encouraged the International Physiology Committee to develop guidelines and procedures for identifying and selecting those national societies with which APS would be interested in jointly sponsoring meetings.
- Council agreed to work towards establishing ties with the Cuban Physiological Society. The International Physiology Committee and staff were asked to determine what was feasible with regard to working with the Cuban Society.

Joint Program Committee



Experimental Biology 2000

EB 2000 was held in San Diego, CA, April 15 through 18, 2000. Scientific sessions and poster sessions were both well-attended. It was generally felt that the excellent attendance of all sessions was in part due to the scheduling of poster presentations unopposed by oral sessions. In addition, situating the posters among the exhibits was thought to be a

success by both meeting attendees and exhibitors alike. The signage for the poster sessions continues to be very well received with only positive feedback that it enhanced the ability to navigate the posters. The carpeting of the exhibit hall, which was extended this year by the EB Program Committee, was also a success in reducing the noise level and facilitating discussions around the posters and exhibits. Another feature of EB 2000 that contributed to its success was a modest shortening of the oral sessions in an effort to offer more variety of oral topic sessions. Limiting the oral sessions to two hours provided the opportunity to schedule three time slots for oral sessions each day of the meeting. This was also the second year that featured topics were programmed into the meeting. The intended use of the featured topic is to solicit abstracts for oral presentations around coordinated, timely topics. This

new format is still generally thought to be a good idea and was used successfully by many of the APS sections to create more focused oral sessions. The flexibility to allow for the creation of abstract-driven oral sessions was felt to be a critical factor in the success of these featured topics. The program committee will be initiating a formal review of this format after EB 2001 to assess the three-year use and impact by each of the sections, as well as its impact on the quality and attendance of the EB meeting.

There were four sponsoring societies at this year's meeting: The American Physiological Society (APS), American Society for Investigative Pathology (ASIP), American Society for Nutritional Sciences (ASNS) and the American Association of Anatomists (AAA). In addition, APS hosted five guest societies: The Microcirculatory Society (MCS), the Biomedical Engineering Society (BMES), the American Federation for Medical Research (AFMR), North American Society for Biorheology (NASB), and the Society for Experimental Biology and Medicine (SEBM). The attendance was excellent for a four-society meeting. Out of a total of 4,647 volunteered abstracts submitted, 2,617 (56%) came through APS. There were 7,131 registered scientists, 1,474 exhibitors, as well as 580 "other" registrants, for a total attendance of 9,185 persons. However, attendance remains a major concern for EB meetings, not only because it reflects the degree of interest by scientists, but also because exhibitors, who are the major source of revenue from these meetings, are encouraged by good attendance.

EB 2000 was the first time in seven years that the meeting was not organized around scientific themes. Although the intention of creating themes that would cross society interests was to create a more coordinated meeting, it was generally agreed by the participating societies that the process of organizing the themes has been an impediment to planning the meeting. As a result, last year the EB Program Committee agreed to eliminate themes (as they currently exist) for future meetings with the understanding that some other process is developed to coordinate "inter-Society" programming. The APS program committee has begun to assess ways to address the need for coordinating the program across societies. Some ideas include the development of "cross-society" symposia, plans for physical juxta-positioning of posters on related themes (e.g., neurobiology), and cooperative programming with relevant small clinical societies either immediately before or after the EB meeting.

The development of EB 2000 represented the first year for the implementation of the recommendations of APS Council to allow for the sections to have more responsibility for developing the scientific program. The intention of these recommendations was to empower the membership and allow sections the opportunity to create meetings within the EB meeting and highlight the best and hottest science. As a result of

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these recommendations, each section has created a Section Program Committee (SPCs) responsible for developing a designated number of Symposia and "Featured Topics." The Chairs of the SPCs, together with the Program Committee, comprise a Joint Program Committee (JPC) charged with the overall quality of the APS program, seeding cross-cutting interdisciplinary "In Foci" elements of the APS/EB meeting, seeding oral sessions (Featured Topics), clustering and coordination of abstracts for the poster sessions and planning "inter-Society" programming. These changes have been embraced enthusiastically by the sections, and it was considered to have been a major contributor to an exciting EB 2000 meeting. The recommended timeline for developing the scientific program has also been modified to maximize inclusion of the late-breaking science at the EB meeting. This included the provision for "Late-Breaking Abstract" submission in February. Feedback on the ability to submit abstracts in February continues to be generally good.

EB 2000 marked the fifth Physiology InFocus program. Organized by Walter Boron the program topic "Channels and Transporters" included four half-day symposia scheduled throughout the meeting. The symposia presented state-of-the-art research on "Aquaporins and Other Members of the MIP Family," "Structure-Function Relationships in Voltage-Gated Ion Channels," Genetic Abnormalities of Channels and Transporters" and "Structural Biology of Channels." Attendance was good, and the quality of the sessions was outstanding. Plans have been made to ensure that Physiology InFocus will be a highlight at EB 2001, both scientifically and in premeeting publicity.

EB 2000 was the first year to introduce two new formats into program: Techniques and Technology in Physiology Tutorial/Workshops and "Cross-Sectional" Symposia. The intention of the tutorial/workshops is to present current cutting-edge technologies in two half-day sessions addressing "What Can Be Done With the Technology" and "How Do You Use the Technology." EB 2000 featured two of these workshops: "Cells and Genes and Their Applications for Therapies for the Brain" and "Bioinformatics: Analysis From Sequence to Disease." In addition, there were two symposia developed to cut across sections: "Physiology of Water Transport" and "Physiological Function Explored in Microgravity."

There was also an effort to integrate the APS missions regarding the promotion of the EB meeting and the APS Journals by soliciting journal sponsorship of selected oral sessions on the basis of scientific content appropriate for the journal. At EB 2000 the *Journal of Applied Physiology* sponsored four oral sessions. The intention is to highlight the scientific topic as a focus of the journal and encourage participants and attendees to consider the journal for publication of their work. This idea was met with enthusiasm from the program committee and will be explored in greater depth with the publications committee to foster means of strengthening

both the meeting and the journals.

Experimental Biology 2001: EB 2001 will be sponsored by seven societies: APS, American Society for Pharmacology and Experimental Therapeutics (ASPET), American Association of Immunologists (AAI), ASIP, ASNS, American Society for Biochemistry and Molecular Biology (ASBMB), and AAA. In addition, APS will host six guest societies: MCS, BMES, AFMR, SEBM, the Association of Latin American Physiological Societies (ALACF) and the Sociedad Española Ciencias Fisiológicas (SECF).

The JPC met in December to schedule abstracts for the EB 2000 meeting and develop preliminary plans for symposia and featured topics for EB 2001. These preliminary plans were distributed to the SPCs responsible for soliciting proposals. The JPC met in April to review the symposia proposed by the sections to ensure minimum overlap or duplication and to suggest areas of potential coordination. The JPC also reviewed the symposia sponsored by the various guest societies of APS. In May, the JPC met again to finalize the recommendations of the SPC's for symposia and featured topics.

In addition to these symposia and featured topics, there will be sessions based on submitted abstracts. There is continuing awareness of the importance of including women and members of under-represented minorities as well as junior scientists on the panels of invited speakers. By and large, the proposals that have been proposed this year showed this awareness. The SPCs will be advised to remind applicants of this matter in considering participants for symposia proposals.

The 2001 Physiology InFocus program will include four sessions and is entitled "Neurotransmitters in Cardiovascular Regulation" organized by **Gerald F. DiBona**. Sessions will focus on angiotensin, glutamate, nitric oxide, and GABA. Three tutorials/workshops are being planned: "Experimental Gene Delivery and Therapy: A Tutorial," "Integrative Approaches for the Study of Physiological Function in Genetically Altered Mice," and "Tissue Engineering: Opportunities and Challenges." Four cross-societal/sectional symposia are also planned: "The Early Impact of Diabetic Hyperglycemia on Renal and Cardiovascular Function," "Interplay Between Nitric Oxide and Hemoglobin: Current Concepts," "Membrane Fusion," and "Vagal Mechanisms of Visceral Sensation: Emerging Concepts." In addition there will be 12 Distinguished Lectureships and the Bowditch and Cannon Lectureships. **Robert J. Lefkowitz**, Duke University Medical Center, will present the 2001 Cannon Lecture on "Regulation of G Protein-Coupled Receptors: Molecular Mechanisms, Physiological Implications and Therapeutic Opportunities." **Peter M. T. Deen** will present the 2001 Bowditch Lecture. The Society will also hold the third annual Walter C. Randall Lecture in Biomedical Ethics, to be given by **Nancy Jones**. APS will also host a special symposia funded by the US Army at EB 2001 entitled "Genomics and Molecular Basis of Exercise and Environmental Physiology."

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APS Conferences: By and large, this program, which was initiated in 1991, has been very successful and is continuing to improve. The Society is striving for a goal in which the vast majority of scientists will consider APS Conferences a premier meeting to attend. At the recent APS Strategic Planning Retreat a proposal was made and approved by Council to increase the number of APS Conferences from two to four per year. The additional two conferences were to be organized on Physiological Genomics and Physiology in Medicine: Translational Research. The JPC has accepted the charge of the Council and has begun plans to organize an APS conference on Physiological Genomics for Fall 2001. The Committee is also soliciting ideas for a conference on Physiology in Medicine to be organized for 2002. APS continues to evaluate the benefits of providing Continuing Medical Education credits (CME) for physicians attending APS Conferences. The JPC and Council reviews and plans all APS-sponsored conferences in accordance with the American Medical Association's ACCME Essentials and Standards.

Scheduled APS Conferences include:

- 2000 APS Conference. August 23-27, Iowa City, IA. "Physiology of the Baroreceptor and Cardiopulmonary Reflexes: Sensory Mechanisms, Central Integration, and Reflex Function," organized by **Mark Chapleau**.
- 2000 APS Intersociety Meeting. September 20-23, Portland, ME. "The Integrative Biology of Exercise," organized by **Peter Wagner**.
- 2001 APS Conference. October 10-14, Banff, Alberta, Canada. "Cellular and Molecular Physiology of Sodium-Calcium Exchange," organized by **Jonathan Lytton**.
- 2001 APS Conference. October, 17-21, Pittsburgh, PA. "Genome and Hormones: The Basis of Gender Differences in Physiology," organized by **Virginia M. Miller**.
- 2001 APS Conference. TBA. "Physiological Genomics," organized by **Curt Sigmund** and **Craig Gelband**.
- 2002 APS Intersociety Meeting. TBA "The Power of Comparative Physiology: Evolution, Integration and Applied," organized by James Hicks. ❖

Judith A. Neubauer, Chair

- Council accepted the Joint Program Committee report.

Liaison With Industry Committee



The newly restructured Liaison With Industry Committee (LWIC) met at the Experimental Biology 2000 Meeting in San Diego, CA. The new committee is now composed of representatives from the Society's Sections. Nearly all committee members are employed in the pharmaceutical industry. This should enable the Committee to better facilitate

Society relationships with industry at the section level where most of the Society activities are based.

The LWIC currently sponsors a Novel Disease Model Award at EB. The LWIC requested that the award description be posted on the APS web page to more clearly define what is expected of the abstract submissions and to highlight the fact that the award exists. Special recognition ribbons or banners should be placed on the posters or mentioned by the session chairs to recognize the selected abstracts. Also, members of the LWIC plan to invite the awardees to dinner during the EB meeting.

Members of the LWIC noted that there is significant interest within the Society membership in knowing how to interact with industry, especially related to presentation of ideas that may have commercial development potential. LWIC members **Glenn Reinhart** (Abbott), **Jack DeForrest** (BMS), and **Joan Keiser** (Parke-Davis) are organizing a workshop for EB 2001 that will cover the following topics: 1) Defining the industry approach to scientific research: how and what determines goals/targets, how projects are prioritized and resourced, the key decision processes and steps, the time points at which patent and proprietary issues become relevant, etc. 2) Interacting with industry: a) proprietary compounds as tools, b) fee for service studies, c) consulting, d) bringing a novel therapeutic/target to a pharmaceutical company for possible development, e) what to expect if invited to be a seminar speaker, and f) good laboratory practices.

The Members in Industry Group has been organized for several years but has not been active. The LWIC plans to revitalize the group through mail and e-mail lists to better communicate the Society activities of interest to this group. There is a strong sense that being able to better identify the other APS members who work in industry is desirable and would facilitate a stronger bond with the Society. The LWIC also requested that APS sponsor a "mixer" for industry members to further help members in industry to meet others with similar interests and concerns.

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The LWIC will be investigating the best means to organize a platform for sharing protocols common to the needs of others in industry. This could also be expanded to include a list of Society members (and others) who have substantial technical expertise with particular cell or animal models who could be used as consultants for specific project needs.

The LWIC plans to work in conjunction with the Career Opportunities in Physiology Committee during its careers session at the EB meeting to facilitate discussions of career choices, to provide networking opportunities, and to increase the visibility of industry members. It perhaps could be combined with a listing of open positions and perhaps an opportunity to discuss potential positions.

The LWIC proposed that if APS desires greater interaction with industry, it must work harder to include industry scientists (not necessarily APS members) on the organizing committees and symposia speaker lists for EB symposia and for APS conferences. The Committee noted that it could assist organizing committees to identify qualified individuals from industry. Sections must also understand the need to include industry scientists on their Section Program Committees, which would serve to develop the “bench to bedside” initiative since most industry scientists, by necessity, are working on things with direct application to healthcare. Since the LWIC is now made up of section representatives, each Committee member will be taking a more direct role in pushing this initiative with the section he/she represents.

Members of the Committee noted that there seems to be a number of people in the Society’s membership who are associated with the healthcare delivery environment and who could be called upon to help educate Society members on “bedside” issues that may impact on the future definitions of unmet medical need and thus will influence the scientific enterprise related to those medical need areas. This area will be looked into in the coming year.

The LWIC pointed out that it is not interested in defining its role based on “what we want from the Society.” As scientists, the needs of members in industry are not any different than other scientists in the Society. To make the LWIC effective, the Society needs to develop a strategy for interacting with industry and work with its industry membership (through the LWIC) to execute on that strategy. ❖

Terry J. Opgenorth, Chair

- Council accepted the report of the Liaison With Industry Committee.
- Council agreed that a detailed description of the Liaison With Industry Award would be included on the Awards Web page.
- Council agreed to fund the LWIC mixer for EB 2001.
- Council agreed that members of the LWIC should be members of their respective Section Program Committees, which would serve to encourage industrial representation on scientific programs. In addition, Council instructed the Joint Program Committee to include a question on conference proposals as to whether industrial representatives have been considered as speakers on the conference program.

Long-Range Planning Committee



The Long-Range Planning Committee (LRPC), in conjunction with the Section Advisory Committee and the APS Council and staff, worked together to develop a 2000 APS Strategic Plan during the Strategic Planning Retreat in November 1999 at Kiawah Island, SC.

The LRPC members were responsible for summarizing issues on the following areas and bringing those issues forward at the retreat: Membership—**Will Beierwaltes**, Finance—**Brian Duling**, Education—**Barbara Horwitz**, Publication—**Helen Cooke**, Meetings—**Richard Traystman**, Public Affairs—**Greg Fink**, and Organizational Operations—**Brian Duling**. Because of the tremendous effort on the part of the LRPC members, the participants at the retreat had a better grasp of the issues facing the Society. This ultimately led to the final goals and objectives for the various portions of the Strategic Plan.

The job of the LRPC now is to begin looking critically at the approved 2000 APS Strategic Plan and determining the most important elements that the Society should be working on in the near future. Several task forces are planned to further study in-depth some of the more important objectives, and it will be necessary to coordinate those groups to ensure the appropriateness of members selected to serve on the task forces, the timeliness of their empanelment, and the ultimate implementation of their recommendations.

The LRPC met in San Diego to discuss the role that the Committee should serve in the immediate future to help in the oversight of strategic goals established at the recent Strategic Planning Retreat. It was recommended that various members of the LRPC should help to coordinate the various task forces

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that are being organized related to the issues defined at the retreat. The Committee stands ready to serve Council as these needs are defined.

Members of the LRPC are looking forward to working closely over the next several years with the APS Council and Martin Frank, the Executive Director, to oversee the implementation of the 2000 APS Strategic Plan. ❖

Allen W. Cowley, Jr., Chair

- Council accepted the report of the Long-Range Planning Committee.

Membership Committee Report



The Membership Committee has conducted two rounds of application evaluations in 2000. A total of 427 applications for regular membership were reviewed; membership was recommended for 420 of those applicants. This is an increase compared to the number of new members as of this time last year.

The Membership Committee met at EB to discuss the issue of how the Membership Committee might best serve the APS membership. The Committee reviewed information provided about the Membership Committees of other FASEB Societies and made the following suggestions. First, during each round of voting, there is a large number of applicants to evaluate. The great majority of these are straightforward acceptances that fit the criteria for regular membership. A smaller number of applications take more time to evaluate for a variety of reasons. The Membership Committee felt that it would be more efficient to have APS staff handle the straightforward acceptances and only pass on for review to the Committee those applications requiring a more in-depth review. Second, because many applications for APS membership are being received from foreign colleagues, the Membership Committee needs to establish a list of foreign journals that fit the Society's criteria for peer-reviewed journals. Currently, many of these journals are unknown to the Committee members and are not available for review in university libraries or online. Third, with a reduced work load related to reviewing applications, the Membership Committee could put more effort into other areas, focusing especially on recruitment, retention and career development needs of APS members.

The current APS Operational Guide lists five duties of the Membership Committee. These are to: 1) review applications for regular membership; 2) hold a meeting at the beginning of the spring meeting of the Society; 3) submit recommendations to Council for election of regular members; 4) prepare explanation letters for candidates whose applications are deferred, declined, or recommended for a different category of membership; and 5) consider all matters pertaining to membership and report its activities to Council. While the fifth duty can be broadly interpreted to include recruitment, the Membership Committee recommended that the Operational Guide be changed to more clearly define the Committee's duties with respect to issues such as recruitment and retention of members. In reviewing the Operational Guides of sister FASEB societies, two of them were found to specifically assign the tasks of recruitment and retention of members to the Membership Committee. Thus, the Membership Committee recommended that the APS Operational Guide be changed to reflect a new role for the Committee in the recruitment of new members and in the retention of members, including but not limited to, member career development needs and member participation in programs and activities of the Society. ❖

Martha E. O'Donnell, Chair

- Council accepted the report of the Membership Committee.
- Council approved the use of APS staff to approve all straight-forward membership applications with the remainder being forwarded to the Membership Committee. Council agreed that final approval will be granted via a Council email ballot on a monthly basis.
- Council agreed to change the wording of the Membership Committee description in the Operational Guide to more accurately reflect the new duties of the Committee.

Perkins Memorial Fund Committee



The Perkins Memorial Fund Committee monitors the Perkins Memorial Fund and reviews applications and selects recipients of the award, which enables visiting foreign scientists to also bring his/her family to the US to enhance their experience.

For the June 1999 deadline, the Committee considered four applications for the Perkins Memorial

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Fellowship Award and recommended approval of three of the applicants. **Karol Dokladny** received the award for March 1999-February 2000 in the laboratory of **Pope L. Moseley** of the University of New Mexico. Also approved was **Snezana Petrovic** for the period of November 1997-June 2001 in the laboratory of **George J. Schwartz** of the University of Rochester (NY). **Maciej Wachulec** received the award for March 1999-February 2000 in the laboratory of **Matthew J. Kluger** of the Lovelace Respiratory Research Institute in Albuquerque, NM.

For the December 1999 deadline, the Committee again considered four applications for the Perkins Memorial Fellowship Award and again recommended approval of three of them. **Han-Suk Kim** received the award for May 1999-April 2001 in the laboratory of **Linda Biadasz Clerch** of Georgetown University. Also approved was **Abu Shamsuzzaman** for the period of April 1999-April 2001 in the laboratory of **Virend K. Somers** of Mayo Clinic. **Carlos Stocco** received the award for December 1998-December 2000 in the laboratory of **Geula Gibori** of the University of Illinois at Chicago.

For the first time in many years, all of the funds available for the 1999 awards were used. The Perkins Memorial Fellowship Committee continues to urge members to nominate foreign scientists for the award who are visiting their laboratories for an extended time with their families. ❖

Aviad Haramati, Chair

- Council accepted the report of the Perkins Memorial Fund Committee.

Porter Physiology Development Program Committee



On March 31, 2000, The Porter Physiology Development Committee Fund had a budget of \$227,601.60. Included in this amount are new contributions of \$110,000 from Merck (\$14,500), the William Townsend Porter Foundation (\$50,000), the American Physiological Society (\$40,000), and Procter & Gamble (\$5,500). The Committee expresses

its sincere appreciation for this continued support that makes the important work of the committee possible.

In January 2000, the Committee served as the review panel for the APS Minority Travel Fellowship Awards. Sixty-one

applications were received with 44 funded. An additional seven travel fellowships were awarded for travel to two APS conferences: "Biology of Potassium Channels: From Molecules to Disease" and "Determinants of Vigilance: Interactions Between the Sleep and Circadian Systems."

The annual meeting of the Porter Physiology Development Committee was held during EB 2000 in San Diego, CA. The following agenda items were discussed at the meeting: current stipend level for the Porter Physiology Development Fellowship; revision of material related to the Porter Physiology Development Fellowship (brochure, APS web pages, and application); funding for special projects related to the goals of the committee; methods to increase the Porter Development Fellowship applicant pool; a reception for travel fellows, their mentors, and past and current Porter Fellows at EB; and review of fellowship applications and naming of the Eleanor Ison-Franklin Fellow and the Merck Fellow.

The Committee discussed the appropriateness of the current stipend level of \$15,000. Considering that the NIH predoctoral fellowships stipend is \$15,060, there appeared to be little justification for raising the Porter stipend level at this time. The Committee suggested, however, a review of other comparable fellowships (especially those awarded by other scientific societies) to determine if the stipend level of the Porter Physiology Development Fellowship is "competitive."

Several items of discussion focused on revision of fellowship materials in an effort to attract funding and outstanding candidates and to refine the application process. The Committee agreed with Council that the brochure requires updating and should contain brief biological sketches and photographs of past fellows. The Committee requested that the existing brochure be placed on the APS web pages. However, APS staff suggested that this might be best expedited after the brochure is revised. In addition, the application for new and renewal fellowships is currently under revision.

The Porter Physiology Development Committee occasionally receives requests for funding for special projects related to the goals of the Committee but for which there is presently no mechanism for funding. The Committee approved the "spirit" of making awards for special projects. Pending approval of the concept of a special projects category for Porter Physiology Development funding by Council, the Committee will move forward with the drafting of guidelines for these special awards.

The Committee is engaged in ongoing discussions concerning increasing the applicant pool for Porter Physiology Development Fellowship. Some of these include several of the items discussed above (competitiveness of stipends, dissemination of fellowship information). Other ideas included letters to undergraduate travel fellows encouraging them to enter graduate studies and apply for Porter support.

The Committee recommended that a reception be held fol-

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lowing the travel fellowship orientation for travel fellows, their mentors, and past and current Porter Fellows. This recommendation was made with the goal of building stronger connections between minority student and the larger community of APS scientists, especially minority scientists.

The Committee reviewed four new applications and four continuing applications for Porter Physiology Development Fellowships. Three of the four new applications were approved for funding, although one person subsequently declined the award, and all continuing applications were approved. The new 2000 Porter Physiology Development Fellows are **Annelyn Torres-Reveron**, designated the Merck Porter Fellow, 2nd year PhD student, Department of Physiology, Ponce School of Medicine, Ponce, Puerto Rico; mentor: **Gregory Quirk**; **Adrienne Hicks**, 3rd year PhD student, Department of Physiology, Meharry Medical College, Nashville, TN; mentor: **Evangeline Motley**. The renewing Porter Fellows are **Robert Carter III**, designated the Eleanor Ison-Franklin Porter Fellow, 4th year PhD student, Department of Integrative Physiology, University of Texas, Health Science Center at Forth Worth; mentor: **Michael Smith**; **Orlando Gonzalez**, 4th year PhD student, Department of Physiology and Anatomy, Puerto Rico Medical Sciences Campus, Rio Piedras, PR; mentor: **Guido E. Santacana**; **Paul Gray**, 5th year PhD student, Department of Physiological Science, University of CA, Los Angeles; mentor: **Jack L. Feldman**; and **Marcelo Febo-Vega**, 4th year PhD student, Department of Physiology and Biophysics, University of Puerto Rico, School of Medicine, Rio Peidras, PR; mentor: **Annabell Segarra**. The Committee requested that the Eleanor Ison-Franklin Porter Fellow and the Merck Porter Fellow be announced during the business meeting at EB to further mark the prestige associated with the designation of these fellowships.

In addition to new and renewal applicants, the Porter Physiology Development Committee continued the support for renewal Fellows approved in 1999: **George Mbella Ekema**, 5th year PhD student, Department of Physiology, Wright State University School of Medicine; mentor: **Lou Lu**; **Cheryl Rust**, 4th year PhD student, Department of Physiology and Biophysics, Howard University School of Medicine; mentor: **Felix Grissom**; and **Stanley Carlyle**, 4th year PhD student, Department of Physiology and Biophysics, Howard University School of Medicine; mentor: **Richard Mills**.

The high level of achievement of the 1999 Porter Fellows was evident to the Committee and given the quality of the 2000 Porter Fellows, there is every expectation that they will continue this strong record of achievement. ❖

Pamela J. Gunter-Smith, Chair

- Council accepted the report of the Porter Physiology Development Committee.
- Council encouraged the Porter Physiology Development Committee to allow Porter Fellows to accept supplemental awards, provided the William Townsend Porter Foundation concurs.
- Council approved the concept of funding special projects and requested the Porter Physiology Development Committee to develop guidelines for handling such requests.
- Council approved of the idea of a social time for past and current Porter Fellows and suggested strongly that they be included in the luncheon for travel fellows and mentors.
- Council agreed that the recipients of the Eleanor Ison-Franklin and Merck Porter Physiology Fellowships would be announced at the APS Business meeting.

Public Affairs Committee



The Public Affairs Committee advises the APS Council on policy issues that influence the conduct of science so that the Society can act on behalf of physiologists. Some issues, such as research funding, are addressed in concert with FASEB providing APS a stronger platform to present its view. During the past year, there were several recurring topics that the

Committee continued to address, as well as some new issues that came before us. Recent articles about APS Public Affairs can be found on the APS website (http://www.the-aps.org/pub_affairs.htm).

Funding for FY 2001 is ahead of schedule for past years, but things may well bog down over the summer with all the final decisions made in the fall. The Senate has “marked up” a bill that would provide a \$2.7 billion increase for NIH that would keep it on track for another 15% increase; the House, limited by budget caps, provided a \$1 billion increase. There appears to be strong sentiment to provide the \$2.7 billion to keep the doubling of the NIH budget on schedule. This is in line with the recommendation from the FASEB Funding Consensus Conference. The proposed increase for NSF was \$167 million, short of the 16% increase recommended by the FASEB Funding Consensus Conference.

While the search for a new NIH Director to replace Harold Varmus is on hold, there are still a number of active issues at NIH that we are watching. Perhaps the most pertinent to physiologists is the ongoing realignment of extramural

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review panels. At the end of the first phase, the Panel on Scientific Boundaries for Review outlined a framework of 24 Integrated Review Groups (IRGs) that would consist of over 100 study sections. The second phase of the project will look at individual study sections. Proposed changes will be posted on the Center for Scientific Review website. Other concerns such as modular grants and the NIH portfolio are under study.

In the past year, FASEB reorganized its public affairs efforts. The Science Policy Committee (SPC) was formed with representation from all the FASEB societies including APS. This group has increased the level of activity in areas such as research infrastructure, stem cell research, NIH funding distribution, modular grants, physician scientists, human studies review, and animals in research. The SPC has been able to increase the public affairs effectiveness of individual societies by increasing involvement of all societies.

The Public Affairs Committee is planning a symposium at EB 2001 to continue the theme of "A Call to Activism." The goal of the program has been to encourage the scientific community to get more involved in public affairs efforts. The focus next year will be ways to effectively communicate scientific results and the importance of science to the public.

A presentation of public affairs activities was made to the Section Advisory Committee (SAC) at EB 2000. In a further effort to broaden APS membership involvement in public affairs, interactions between the SAC and the Public Affairs Committee will provide a conduit for members and sections to initiate concerns in the public affairs arena and respond to issues as they arise. The Public Affairs Committee feels that it is important for all physiologists to understand and participate in science policy. ❖

J.R. Haywood, Chair

- Council accepted the report of the Public Affairs Committee.

Publications Committee



Under Council direction, Executive Director Martin Frank and Director of Publications Margaret Reich have met again with David Lipman to negotiate the criteria for potentially putting APS journals in PubMed Central.

A Pricing Task Force will meet this fall to discuss the journal pricing model, including author charges, and develop a new model

that keeps the publishing program viable during the shift from

demand for print to electronic publishing. **Dale Benos**, Publications Committee Chair, will head this task force, which will include APS members who have served on the Finance Committee, as APS Journal Editors, on editorial boards of other journals, librarians, and a publishing consultant.

The Publications Committee will be interviewing candidates on October 18, 2000, for the Editorships of *AJP-Renal Physiology* and *Advances in Physiological Education*.

APS staff is working on a proposal for the Publications Committee to review regarding publishing papers upon acceptance online.

The article published in the June 2000 issue of *The Physiologist* and various editorials written by the Editors of the *AJP* journals help promote the new Impact Factors for the *AJP* section journals and describe some of the ways the Editors are working toward improving the Impact Factors.

The Publications Committee will design a certificate for Editorial Board members as they cycle off of Journal Editorial Boards.

The Publications Committee would like to explore ways to collect invited reviews from all the journals and publish them together, preferably online. ❖

Dale J. Benos, Chair

- Council accepted the report of the Publications Committee.

Section Advisory Committee



The Section Advisory Committee (SAC) met separately and in joint-session with the APS Council on Friday, April 14 prior to the Experimental Biology (EB) meeting in San Diego. Topics discussed included: 1) Programming, 2) Communication with the members 3) Awards, and 4) Impact of the Strategic Plan on section activities. In addition, the chair of the

Public Affairs Committee, **J.R. Haywood**, briefed SAC on recent activities of that committee and SAC provided input about areas of concern by the sections and membership.

Programming

The Section Program Committees are functioning well and sections are using their newsletters to advertise their programming contributions to their members. However, the committee recognized several aspects of the Experimental Biology meeting that require improvement. Call for

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Abstracts: it was felt that the Call for Abstracts is confusing and cumbersome. It was recommended that the Joint Program Committee (JPC) reassess the Call for Abstracts to streamline it as much as possible. Attracting the highest quality abstracts: SAC felt that the quality of the submitted abstracts was not as good as the invited symposia. Two suggestions were made to address this problem. The first was to encourage all symposia participants and distinguished lecturers to submit abstracts. The second was for the Sections to work with the JPC and the marketing office to design Call for Abstract booklets specifically geared to specialty clinical groups. Distribution of symposia and featured topic slots among the sections: it was recommended that the JPC reassess the distribution of these slots every two years to ensure that the distribution corresponds with the distribution of submitted abstracts.

The sections have found that the current allotment for activities that facilitate student interaction with the Distinguished Lecturer is inadequate. Therefore, an increase in this allotment from the current \$1,000 to \$2,000 per year is requested.

Membership

Two mechanisms that were discussed that would improve communication with section members and individuals in the field that are not APS members include the following: repopulate (update) the listservs for each section, which was already done, and use the APS journals (both print and online) as a communication tool for section members and to encourage non-members to join APS. There was discussion that a web banner be added to the first page of online journals, and also that the section web page be hyperlinked to the journal sites and vice versa. The web page listing the journal editors should also include a hyperlink to the section and information on joining APS and sections.

A recommendation was made that targeted marketing campaigns be developed for specific section symposia at all meetings where APS exhibits.

Awards

This was the first year for the Young Investigator Award. The experience of the various sections was discussed and the following recommendations were made to facilitate selection of the recipients of this award in future years. It is recommended that the APS description of the award be modified to include the requirement that the applicant must submit an abstract to EB. The abstract could be submitted as a late-breaking abstract. Abstracts would be used in the selection process. Each section will develop a list of criteria for selection. These will be posted on the web and may vary from section to section. Applicants will be directed to the web to obtain the review criteria for each section. It was requested that complimentary registration be included as part of the award. It was recognized that timely selection of the recipient

will be required for this to be implemented.

SAC recommended that a central office coordinate the final selection of student awardees so that a single student does not receive multiple awards. The initial selection process could occur as in the past, but each selection committee would be asked to indicate second and third choices that the central office could use if the first choice has been chosen for multiple awards. The student would receive the award with the highest monetary value.

Impact of Strategic Plan on Sections

The impact of the strategic plan on sections was discussed. There were two issues of concern to the sections. The first was adequate representation of the current sections on the Task Force to study the formation of new sections. SAC recommended that the task force include representation of each of the current sections. The second issue was the organization of recurrent APS Conferences should include input from current sections. It was felt that the strongest conferences would be ones that would attract participants from multiple sections as well as non-APS members. ❖

Celia D. Sladek, Chair

- Council accepted the report of the Section Advisory Committee.
- Council approved the increased allotment for Distinguished Lecturer activities with students.
- Council approved complimentary registration at the advanced registration rate for the Young Investigator Awards.
- Council instructed APS staff to continue to work on improving the notification process for all the awards, both Society and section.
- Council agreed to include input from the sections on the Task Forces on Sections and Conferences.

Senior Physiologists Committee



A major responsibility of the Senior Physiologists Committee is to correspond with members of the American Physiological Society who are 70 years old or older. During the year, letters were sent to members on their 70th birthdays and cards were sent to those turning 80 and 90 years old, each with a personal note and a request for a reply to be published

in *The Physiologist*. Approximately 158 members were sent

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letters. In the past year, 38 responses to these letters have been received and published.

In addition, the members of the committee review any applications received for the G. Edgar Folk, Jr. awards. These awards are made to emeritus members 70 years or older for such purposes as attending a meeting, engaging in modest experiments, or completing a manuscript. However, no applications were received last year. ❖

Eugene M. Renkin, Chair

- Council accepted the report of the Senior Physiologist Committee.

Women in Physiology Committee



APS Women in Physiology Mentoring Workshop

The Women in Physiology Committee is charged with promoting the discipline of physiology as a rewarding career for women and encouraging their active participation in APS functions.

In 1993 the Committee established a Mentoring Program that was designed to provide advice, encouragement, support, and networking opportunities for women physiologists who are currently in training or have just started a new position in academia or industry. Senior physiologists of both genders are paired with junior female physiologists on the basis of common research and/or career interests. Because the mentors and mentees are usually geographically separated, face-to-face communications are rare. However, the Experimental Biology meeting offers a convenient venue for one-on-one meetings of mentors and mentees. To take best advantage of this opportunity, the Committee has sponsored an Annual Mentoring Workshop and Reception to provide a forum for such contacts. Because one major barrier to the success of women in scientific careers is their reduced access to mentoring and networking opportunities, the Committee views the Mentoring Workshop as central to the successful prosecution of its core charge. Since 1997, support has been obtained from Council to have a box lunch available at the Workshop. Admission has been by tickets distributed in advance by the APS Education Office. Preference has been given to current participants in the Mentoring Program, recipients of the Caroline tum Suden and other APS travel awards for students and postdoctoral fellows; the remaining tickets have been distributed on request. The luncheon format has proven very successful. Each year the event has been well-attended and a considerable block of time has been allotted for informal discussions to enhance

networking opportunities for the junior attendees. Support for this event was requested again, which would cover the support of approximately 125 attendees (current and potential participants in the mentoring program, student and fellow APS travel award winners, members of the Women in Physiology Committee, and Chairs of the APS Sections). The Committee proposed changing in the workshop format for EB 2001 and hosting a buffet breakfast instead of a luncheon. Several advantages of this format were identified. A morning session was deemed easier to fit into most schedules (not interfering with poster sessions that are manned during the lunch hour) and, since this is often the first time for a mentor-mentee pair to meet face-to-face, having the workshop/breakfast on the first full day of the meeting is expected to facilitate further interaction of mentees and mentors during the meeting. This breakfast will serve as a lead-in to a morning workshop designed to mentor young scientists on how to write, review, and publish manuscripts.

APS/ASPET Workshop on Scientific Writing

One of the roles of the APS Women in Physiology Committee is to coordinate activities with other such committees on women within FASEB. To this end, the APS Women in Physiology Committee has initiated a plan to co-sponsor a workshop with American Society for Pharmacology and Experimental Therapeutics (ASPET) at EB 2001. The plan is to have an interactive workshop on how to write, review, and publish manuscripts in APS and ASPET journals. This workshop will offer very practical tools, skills, and advice on scientific writing. Attendees will be actively involved by looking at examples of material submitted for publication, critiquing them, and evaluating them for meeting the goals of the journals to publish the highest quality science. Women who have served as Editors/Associate Editors of APS and ASPET journals will lead the audience, which is expected to be comprised of students, fellows, and young faculty of both genders in a morning session designed to provide valuable advice on what it takes to get a paper published in the Society journals. **Kim Barrett** (editor of *AJP: Cell Physiol.*) has agreed to Chair the session. Other APS Editors/Associate Editors who have enthusiastically agreed to serve on the panel are **Kathy Berecek** (former Associate Editor, *AJP: Heart Circ. Physiol.*) and **Judy Neubauer** (Assoc. Editor, *J. Appl. Physiol.*) A third APS Editor/Associate Editor will be identified. Margaret Reich, the APS Publications Manager, has also been invited to participate in this session. This workshop is expected to complement (not duplicate) the session planned by **Dale Benos** and Margaret Reich on how to publish in APS journals.

It is hoped by the Committee that this will be the first of an annual EB workshop co-sponsored by the Women in Physiology and Women in Pharmacology Committees that

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deals with issues that enhance the professional development of young scientists. Discussions have already been initiated to hold a Workshop on Grantsmanship at EB 2002. The panelists for this workshop might be APS/ASPET women who have served on NIH Study Sections.

APS Mentoring Program for Women in Physiology Travel Fellowship Program

Some of the most positive feedback received on the Women in Physiology Mentoring Program has been from mentor/mentee pairs that have had the opportunity to meet and/or collaborate outside the meeting/conference setting. In the rare cases in which the mentor or mentee was able to visit the other's institution to learn a laboratory technique and/or present a seminar, a much more long-lasting mentoring relationship has developed. For most mentor/mentee pairs, one-on-one contacts are limited to EB meetings and, thus, the value of the mentoring program is more limited. The Women in Physiology Committee discussed the potential benefits of providing travel fellowships to facilitate interactions of mentors and mentees in the APS Women in Physiology Mentoring

Program. This could allow the mentee to visit the mentor's laboratory to learn a new technique or for the mentor to visit the mentee's institution to present a research seminar. This award program would be coordinated by the APS Education Office. The award would be competitive and the review process would be completed by the Committee, likely involving a teleconference call. Mentors and mentees would be required to submit an application jointly and to provide a brief written report on the results of the travel fellowship. Awardees would be selected based on the potential of the proposed visit to strengthen the career development of the mentee and, where appropriate, the mentor. ❖

Susan Barman, Chair

- Council accepted the report of the Women in Physiology Committee.
- Council unanimously approved the request of the Women in Physiology Committee for continuation of allocation of \$2,000 for a mentoring breakfast.
- Council requested more information about the proposed Travel Fellowship Program, including selection criteria, etc.

Committee Reports Online

The 2000 Committee Reports are now available for viewing online, as well as committee actions pertaining to them.

Check them out and keep informed of

APS Committee Actions.

<http://www.the-aps.org/committees.htm>.

Get Involved!

Are you interested in becoming a member of an APS Committee? Nomination forms are available to download from the APS website.

<http://www.the-aps.org/committees/nominate.htm>.

Experimental Biology 2001

March 31-April 4, 2001 • Orlando, FL



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

Robert J. Lefkowitz
Duke University

*“Regulation of G Protein-
Coupled Receptors: Molec-
ular Mechanisms, Physio-
logical Implications and
Therapeutic Opportunities*

SATURDAY, MARCH 31, 5:30 PM



HENRY PICKERING BOWDITCH
AWARD LECTURE

Peter M. T. Deen
University of Nijmegen,
The Netherlands

*“The Aquaporin-2 Water
Channel in Health and
Disease”*

SUNDAY, APRIL 1, 5:30 PM

Distinguished Lectureships



JOSEPH ERLANGER
DISTINGUISHED LECTURESHIP
OF THE CENTRAL NERVOUS
SYSTEM SECTION

Gerald D. Fishbach
NINDS, NIH

*“Plasticity at Peripheral and
Central Synapses”*

SUNDAY, APRIL 1, 8:00 AM



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

William C. de Groat
University of Pittsburgh

*“Plasticity in Sacral
Autonomic Reflex Pathways
During Postnatal
Development and After Neural
Injury”*

SUNDAY, APRIL 1, 2:00 PM

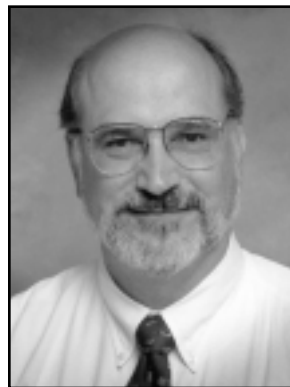


CLAUDE BERNARD
DISTINGUISHED LECTURESHIP OF
THE TEACHING OF PHYSIOLOGY
SECTION

Joel A. Michael
Rush Medical College

*“In Pursuit of Meaningful
Learning”*

SUNDAY, APRIL 1, 3:15 PM



ROBERT M. BERNE
DISTINGUISHED LECTURESHIP
OF THE CARDIOVASCULAR
SECTION

William M. Chilian
Medical College of Wisconsin

*“Adaptations of the Coronary
Circulation to Ischemia—From
Chaos to Collaterals”*

MONDAY, APRIL 2, 8:00 AM



HUGH DAVSON
DISTINGUISHED LECTURESHIP OF
THE CELL AND MOLECULAR
PHYSIOLOGY SECTION

Carolyn W. Slayman
Yale University

*“Structure, Function, and
Biogenesis of a Model Cation
Pump”*

MONDAY, APRIL 2, 10:15 AM



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

Richard J. Roman
Medical College of Wisconsin

*“P450 Eicosanoids in the
Control of Renal Function,
Vascular Tone and Arterial
Pressure”*

MONDAY, APRIL 2, 2:00 PM

Experimental Biology 2001

March 31-April 4, 2001 • Orlando, FL

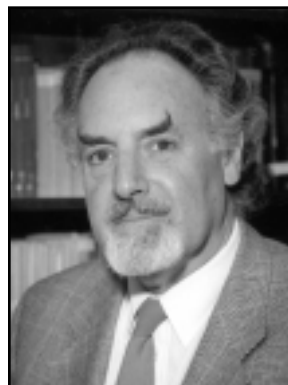


SOLOMON A. BERSON
DISTINGUISHED LECTURESHIP
OF THE ENDOCRINOLOGY AND
METABOLISM SECTION

Frank Talamantes
University of California-
Santa Cruz

*"Structure and Regulation of
Expression of the Growth
Hormone Receptor and
Binding Protein"*

MONDAY, APRIL, 2, 2:00 PM



HORACE W. DAVENPORT
DISTINGUISHED LECTURESHIP OF
THE GASTROINTESTINAL
SECTION

Geoff Burnstock
University College, London

*"Purinergic Signaling in the
Gut"*

MONDAY, APRIL, 2, 3:15 PM



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

George A. Brooks
University of California-
Berkeley

*"The Lactate Shuttle: New
Interpretation of Old Ideas"*

TUESDAY, APRIL 3, 8:00 AM



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

John E. Remmers
University of Calgary

*"Breathing and Sleeping: A
Physiological Conundrum for
Humans"*

TUESDAY, APRIL 3, 10:15 AM



AUGUST KROGH
DISTINGUISHED LECTURESHIP OF
THE COMPARATIVE
PHYSIOLOGY SECTION

Peter W. Hochachka
University of British Columbia

*"Conservation and Adaptation
in Evolution of Human Hypoxia
Response Physiology"*

TUESDAY, APRIL 3, 2:00 PM



CARL W. GOTTSCHALK
DISTINGUISHED LECTURESHIP
OF THE RENAL SECTION

James A. Schafer
University of Alabama-
Birmingham

*"Abnormal Regulation of
ENaC in the Collecting
Duct—Syndromes of Salt
Wasting and Retention"*

TUESDAY, APRIL 3, 3:15 PM

Third Annual Walter C. Randall Lecture in Biomedical Ethics

Scientific Professionalism: Possessors or Pursuers of Truth?

Nancy Jones, Wake Forest University

TUESDAY, APRIL 3, 2:00 PM

The Role of the Amygdala in the Physiology of Emotion

APS Neural Control and Autonomic Regulation Section

Ralph Adolphs and William T. Talman

R. Adolphs, D. Amaral, E.A. Murray, M. Davis, and W.T. Talman

The amygdala plays a key role in the regulation of autonomic and neuroendocrine responses, as well as the processing of emotion, including its relevance to the guidance of social behavior. How are these two aspects of amygdala function related? Evidence will be presented that the amygdala participates in the processing of emotion precisely as it participates in physiological regulation, that is somatic homeostasis and regulation in a very broad sense are essential aspects of all emotions. The speakers will review the anatomy and function of amygdala in rats monkeys and humans and its relationship to emotion and social behavior, suggesting that the amygdala participates in cognition emotion and physiological regulation because all three of these processes are in fact critically interdependent on each other.

Programming of the Fetus In Utero: Impact on Physiology in Adulthood

APS Endocrinology and Metabolism Section

Eugene D. Albrecht

E.D. Albrecht, P.W. Nathanielsz, G.J. Pepe, J.R. Seckl, and D.J.P. Barker

It is clear based on the results of physiological studies in animals, clinical observations and epidemiological studies that programming of the fetus in utero has a major impact upon function and well-being in adulthood. The imprinting that occurs during fetal development may be as important as genetic makeup in determining the outcome postnatally and in adulthood. Recent experimental studies conducted in the primate, for example, by G.J. Pepe and E.D. Albrecht (*Endocrine Reviews* 16:608-648, 1995; *Placenta* 20:129-139, 1999) have shown that the high levels of estrogen to which the baboon fetus is exposed have a central integrative role in regulating the maturation of the fetal adrenal gland directly as well as indirectly by acting on the placental 11 β -hydroxysteroid dehydrogenase enzymes that control the level of cortisol transported into the fetus that results in activation and maturation of the fetal pituitary-adrenocortical axis. Consequently, there are striking estrogen-dependent changes in the development of the primate fetal adrenal gland that may have significant impact on endocrine function in the adult. Clinical studies in humans and studies in animals by J.R. Seckl et al. (*J. Clin. Invest.* 101:2174-2181, 1998) have shown that excess secretion of cortisol into the fetus causes intrauterine growth restriction, improper fetal development, and glucose intolerance in adulthood. In turn the epidemiological

studies of D.J.P. Barker et al. (*Lancet* 1:1077-1081, 1986) indicate that the incidence of several diseases of adulthood (e.g. essential hypertension, cardiovascular disease, diabetes) are correlated with fetal birth weight, fetal stress, and maternal nutritional status. Experimental studies in laboratory rats are consistent with the epidemiological studies since maternal low-protein-diet reproducibly produces elevations in blood pressure in adult offspring (*Langley-Evans Handbook of Hypertension* 19:539-576, 1999). The symposium will be presented by experts in the area such as referenced above and focus on the topic of epigenetic programming and impact on physiological systems in adulthood. This symposium is very timely because this area of fetal programming has recently had considerable public interest (e.g., in November 1999 issue of *Newsweek*). The symposium should be of considerable interest to physiologists who focus on development endocrinology reproduction, as well as individuals interested in issues of health and disease.

Tight Junctions: Convergence of Molecular and Physiologic Insights

APS Cell and Molecular Physiology Section

James M. Anderson

J. Anderson, K. Spring, M. Furuse, and A. Nusrat

Intercellular tight junctions are the major barriers regulating paracellular transport. Physiologic studies beginning in the middle of the 20th century demonstrated that the barrier properties of tight junctions varied considerably among epithelia. They vary in electrical tightness and ion and size selectivity. The barrier is regulated by physiologic signals and is disrupted in pathologic conditions. Recent advances have been made in identifying the proteins that create the paracellular barrier. Mutations in mice and humans have highlighted the role of some of these proteins and we are on the verge of being able to explain the molecular basis of the tight junctions' properties. Speakers in this session will address how individual tight junction proteins contribute to defining the permeability properties of paracellular transport, how the barrier is regulated by cellular signaling pathways and signals from leukocyte, and will return to unresolved physiologic questions about the tight functional permeability to water and specific solutes.

Neurohumoral Control of the Normal and Diseased Heart

APS Cardiovascular Section

Jeffrey L. Ardell

J.L. Ardell, J.A. Armour, R.D. Foreman, M.C. Andresen, and L.J. Dell' Italia

This symposium will provide an overview of the neurohumoral interactions that are involved in cardiac regulation in

normal and diseased hearts. The basic thesis to be presented in this symposium will be that neural control of the heart depends upon multiple feedback systems within the heart thorax and central nervous system, each operating as interdependent units within this neurohumoral hierarchy to regulate cardiac function on a beat-to-beat basis. These multiple feedback loops operating from the level of the intrinsic cardiac nervous system to the cortex utilize a number of neurochemicals for synaptic transmission and modulation. Recent data has indicated that the evolution of cardiac disease may be accompanied by a corresponding remodeling not only of end-organ myocytes but neurohumoral mechanisms that control them. This remodeling has important implications with respect to the time-dependent cardiac therapy that employs β -adrenergic blockade ACE inhibitors or angiotensin II receptor blockade. Therefore, this symposium will stress not only the importance of understanding this neuronal hierarchy in normal states, but will emphasize neurohumoral regulatory mechanisms operating in specific cardiac disease states.

The symposium will consist of five speakers. Ardell will discuss the functional organization for neural control of the heart and the interplay between neural and hormonal factors in the dynamic control of regional cardiac function. Armour will then discuss the capacity of various populations of cardiac afferent neurons to induce cardiovascular reflexes relating recently derived information concerning their complex transduction properties to the symptomatology of heart disease. Foreman will then present recent data concerning intrathoracic and spinal cord neuronal interactions and relate that data to the rationale for the clinical use of spinal cord stimulation in the treatment of angina secondary to myocardial ischemia. Andresen will summarize recently derived data concerning the role of medullary control circuits in cardiac regulation. Dell' Italia will conclude the symposia by discussing neurohumoral remodeling that accompanies progression into cardiac hypertrophy/congestive heart failure.

Gene Therapy for Cardiovascular Disease

APS Cardiovascular Section

Kathleen H. Berecek and Victor J. Dzau

V.J. Dzau, K.H. Berecek, M.K. Raizada, J.M. Isner, and J. Chao

The latest findings on the effectiveness of gene therapy for the treatment and possible prevention of cardiovascular diseases will be presented.

Vagal Mechanisms of Visceral Sensation: Emerging Concepts

APS Cross Sectional Committee

Clark M. Blatteis and Helen E. Raybould

C.M. Blatteis, C. Helke, L. Watkins, D. Grundy, and S. Mifflin
Approximately 80% of the axons of the vagus nerve are

sensory afferents rather than parasympathetic efferents. However, the specific function of these afferents is almost completely unknown, even though they likely represent the major sensory pathway by which the brain is informed of visceral function. Recent evidence suggests that vagal afferents transduce and convey to the CNS a wide array of visceral stimuli, including those concerned with nutrient and mineral balance, gut distension, local hormone secretion, and immune and inflammatory signals. This cross-sectional symposium will focus on the diversity of the signals sensed by the vagus nerve, arising from different viscera and the functional consequences of these signals. The presentations will cover areas of neurochemistry (expression of peptides and receptors by vagal afferents), the response of vagal afferents to different stimuli (immune mediators stress mediators nutrients), and the central pathways activated by vagal afferents. The speakers will present research results from different organ systems and emphasize the similarity and differences of vagal afferent innervation between viscera. Implications for understanding the physiology and pathophysiology of functions as diverse as pain sensitivity, mood disorders, feeding behavior, and acute and chronic inflammatory disease, will also be addressed.

Genomics and Molecular Basis of Exercise and Environmental Physiology: Molecular Basis of Human Performance

US Army

Claude Bouchard

C. Bouchard, T. Rankinin, M. Bray, H. Montgomery, and S. Britton

It has long been suspected that there is a hereditary component to human physical performance, but the genetic basis of exercise remains elusive. This symposium will review our current knowledge of the genetic basis of human performance, will discuss an emerging animal model that may enable a genetic analysis of the problem, and will discuss the first gene implicated in human physical performance: angiotensin converting enzyme.

The Early Impact of Diabetic Hyperglycemia on Renal and Cardiovascular Function

APS Cross Sectional Committee

Michael W. Brands and Pamela K. Carmines

P.K. Carmines, G.J. Rozanski, G.H. Bohlen, M.W. Brands, and P. Cortes

Diabetes has long been associated with excess renal- and cardiovascular-related morbidity and mortality. Although much work over the years has focused on the pathophysiology of the established disease, emerging evidence now indi-

cates that myriad alterations in renal, cardiac, and vascular control systems are evident at the earliest stages of diabetes. Many of these alterations suggest that hemodynamic mechanisms may act in concert with direct tissue actions of hyperglycemia, beginning very early in diabetes to promote the deleterious changes in cardiovascular tissue structure. For example, Carmines has provided evidence of altered electro-mechanical coupling in renal preglomerular microvascular smooth muscle within two weeks of onset. In addition, Cortes has demonstrated a marked potentiation of the effects of hyperglycemia on mesangial glycogen production by increased mechanical strain. A system with considerable potential to be involved in these processes is the nitric oxide (NO) system, which is extremely sensitive to glycemic control. Both hyperinsulinemic and hypoinsulinemic models of diabetes exhibit altered endothelial regulation of the microvasculature and Brands has reported that NO production is required to prevent hypertension at the onset of Type I diabetes, possibly due to suppression of renin secretion. Moreover, Bohlen has documented that acute (<1hr) exposure to a hyperglycemic environment provokes alterations in NO-dependent arteriolar dilation that can be attributed to oxygen radical formation. The oxidative stress associated with hyperglycemia also exerts deleterious effects on the heart as Rozanski has implicated alterations in glutathione redox state as one factor that alters K⁺ channel function in cardiomyocytes during the early stage of diabetes. Thus, the black box that was previously positioned between the diagnosis of diabetes and the onset of complications (such as microalbuminuria, retinopathy, and hypertension) has given way to evidence implicating early interdependent changes in control systems at all levels of the cardiovascular system.

Physiology InFocus: Neurotransmitters in Cardiovascular Regulation: Nitric Oxide

David S. Breddt

D.S. Breddt, C. Iadecola, W. Sessa, P. Huang, and J. Stamler

Nitric oxide (NO) is a free radical molecular messenger that mediates diverse actions, particularly on the heart and circulatory system. Though first discovered as an endothelial derived relaxing factor, it is now clear that NO controls the cardiovascular function through regulation of vasodilator nerves, oxygen transport, and cardiac contractility. Nitric oxide is produced by a family of NO synthase (NOS) enzymes that are differentially expressed and distinctly contribute to cardiovascular regulation. Targeted disruption of these genes in mice has expanded our understanding of the roles for each isoform. In addition to its physiological functions, NO as a free radical mediates cell and tissue damage in various disease states. The symposium will highlight recent advances in regulation of cardiovascular function and disease by the unique neurotransmitter NO.

Membrane Fusion

APS Cross Sectional Committee

Dennis Brown

D. Brown, P. Hanson, J. Zimmerberg C.L. Chou, and S. Breton

Numerous renal transport phenomena are governed by regulated exocytosis. In the past few years the molecular components of the cellular fusion apparatus have been identified and their interactions elucidated. This symposium will focus on the current understanding of the structure and function of the membrane fusion apparatus in general and as it applies to renal physiology.

Myosin Isoforms and Smooth Muscle Function: New Technology New Questions

APS MyoBio Section

Frank Brozovich and Richard J. Paul

A.V. Somlyo, A.P. Somlyo, A.S. Rovner, H.L. Sweeney, F. Brozovich, A.F. Martin, M. Periasamy, and R.J. Paul

The molecular motor myosin is present in smooth muscle in various isoforms. These isoforms, known to change during development, are dependent on hormonal status such as estrogen levels and are altered in disease states, such as hypertension. Yet the connection between isoform and function remains largely open. This symposium will cover the most recent evidence arising from application of cutting edge molecular and biophysical technology. In particular, presentations will range from the use of laser molecular traps to study individual myosin molecules the latest electron microscopy reconstruction of myosin filament models to the function of myosin isoforms at the whole animal level uncovered using newly developed transgenic mice models.

DNA Microarray in Bioengineering and Physiology

Biomedical Engineering Society

Shu Chien

S. Chien, E.S. Lander, M. Schena, and M.S. Boguski

The Human Genome Project has resulted in the generation of a large database of genes with known sequence and a vast number of loci have been assayed in genome scans. The impending availability of the sequence and loci data on all human genes poses the opportunity and challenge to organize the information into a body of knowledge for the derivation of functional roles and phenotypic traits for not only the individual genes but also families of genes in relation to one another. Therefore, the next grand challenge in biology is to decipher functional genomics (or physiological genomics) by

leveraging on the knowledge derived from genomic sequencing and mapping. By seizing this unprecedented opportunity, we will be able to elucidate biological functions in an integrative manner from genetic and molecular levels to organs and organisms. This approach will enable major breakthroughs in life sciences and medicine.

The biochip microarray systems have provided the timely new tools to meet the needs of functional genomics by furnishing a global strategy that is much more systematic and powerful than the piecemeal approach. The biochip microarray is prepared by attaching multiple nucleic acid probe molecules to a solid support (e.g. glass slide or filter). The nucleic acid molecules from the biological samples to be interrogated are labeled with fluorescent labels chromogens or radioisotopes and such labeled targets are then hybridized with the probes on the microarray. Scanning of the intensity of the label at each address on the microarray allows an assessment of the degree of hybridization between the nucleic acids in the target sample and those in the arrayed probes. The analysis of the large volume of data points requires the computational approach of bioinformatics. Thus, the effective utilization of the biochip microarray technology requires a combination of a number of engineering disciplines with biology and medicine i.e. biomedical engineering.

Biochip microarray technology has tremendous potential for the solution of physiological problems and for application to pathophysiology and medicine. There are a few examples of the application of cDNA microarrays to study the molecular mechanisms of physiological processes, but the tremendous potential has remained virtually untapped. It is high time for bioengineers and physiologists to explore the enormous opportunity of using biochip microarray to study the molecular genetic basis of functional behavior of biological systems in an integrative approach. This will undoubtedly open new horizons for the fundamental understanding of functional regulation and disturbance in health and disease.

In terms of life sciences, microarrays will provide the answer to the grand challenge of deciphering functional genomics. In terms of clinical medicine, microarrays offer new ways of diagnosis and treatment, including the development of individualized approaches based on genetic polymorphism. There is good reason to believe that microarrays will become the standard tool in both life science research and clinical medicine. We must seize this opportunity to apply this frontier technology for research in biomedical engineering and physiology. This symposium will meet this timely need of introducing the new technology of biochip microarrays so that it can be widely used for scientific inquiries into the basic mechanisms of functional regulation and the pathophysiological basis of disease states.

Matching Technology to Education: How to Choose the Right Technology to Meet Your Educational Needs

APS Teaching of Physiology Section

Corey L. Cleland

J. Michael, C. Cleland, P. Stephens, and M.A. Rokitka

The use of information technology in all aspects of education is expanding. In parallel, greater emphasis is being placed on the identification and assessment of educational goals. This symposium is designed to explore how to match educational objectives to instructional methods. In particular, it should be clear that otherwise good education and good technology can be mismatched, leading to an unexpected decrease in learning. The audience should come away with an appreciation that because of the recent proliferation of new and importantly unfamiliar technology, far more attention must be directed to the link between educational goal and instructional methodology than ever before.

Vasopressin: Integrative and Cellular Mechanisms of Release and Actions

APS Water and Electrolyte Homeostasis Section

J. Thomas Cunningham and Celia Sladek

H. Gainer, C.D. Sladek, C.W. Bourque, J.T. Cunningham, and R.W. Schrier

Vasopressin is a peptide hormone that is released from the posterior pituitary by magnocellular neurosecretory cells located in the hypothalamus. Physiologically, vasopressin functions primarily as an antidiuretic, although it can also act as a vasoconstrictor, affect sodium reabsorption, and alter autonomic reflex function. The magnocellular neurons in the supraoptic and paraventricular nuclei of the hypothalamus, which are responsible for production and release of vasopressin, have long been studied as a model system for understanding the neuroscience of neuroendocrine function. The functions of vasopressin have made it an area of intense study for researchers interested in understanding body fluid homeostasis. These aspects of vasopressin research make it an important intersection of neuroscience and traditional physiology involving multidisciplinary and integrative research. Recent technological advances and new scientific discoveries have increased our understanding of both the neuroscience and the physiology of vasopressin. The purpose of this symposium will be to present an update of recent advances in vasopressin research and provide an integrative overview of the regulation and function of vasopressin, including its role in pathophysiological states. The participants will include Gainer, whose laboratory provided the pioneering evidence for prohormone processing in secretory granules and is cur-

rently using state-of-the-art approaches to study physiologically-induced differential gene expression in magnocellular neurons. Sladek has pioneered the use of *in vitro* approaches to study vasopressin release and the regulation of vasopressin gene expression and how this system is altered by steroid hormones and aging. Bourque will present his recent work on the biophysics of magnocellular neurosecretory cells focusing on how these neurons integrate multiple synaptic inputs. Cunningham will discuss recent advances in the understanding of the neural networks that regulate the activity of vasopressin neurons in relation to changes in the internal environment. Schrier will discuss current approaches used to examine the actions of vasopressin on the kidney, including vasopressin escape. This symposium will provide a comprehensive look at current findings to promote future research that will increase our understanding of vasopressin and its role in body fluid homeostasis.

Physiology InFocus: Neurotransmitters in Cardiovascular Regulation: Angiotensin

Roger A.L. Dampney

R. Dampney, A. Allen, C. Sumners, D. Diz, and J. Paton

The circulating hormone angiotensin II has long been known to play a crucial role in blood pressure regulation and fluid homeostasis. In the 1980s it was also discovered that there are receptors for angiotensin II in brain regions that play a critical role in cardiovascular regulation such as the nucleus of the solitary tract and the ventrolateral medulla but which are not accessible to circulating angiotensin II. In recent years, evidence has accumulated indicating that brain angiotensin II may be of particular importance in the long-term regulation of sympathetic activity and blood pressure and may also be a factor contributing to increased sympathetic activity in cardiovascular disorders such as heart failure and some types of hypertension. This symposium will highlight recent advances in our understanding of the functions of angiotensin II in the regulation of cardiovascular neurons in the brainstem. The topics covered include the cellular mechanisms of action of angiotensin II, its interactions with other transmitter systems, and its contribution to both the tonic and reflex control of blood pressure.

Neuronal Mechanisms Underlying Associative Learning

Sociedad Espanola Ciencias Fisiologicas

Jose M. Delgado-Garcia and Bernard G. Schreurs

A. Gruart, J.F. Medina, J.H. Freeman, B.G. Schreurs, and J.M. Delgado-Garcia

The classical conditioning of eyelid/nictitating membrane responses is a widely used experimental procedure for study-

ing the neuronal mechanisms underlying associative learning and memory storage. The kinematics, frequency-domain properties, and movement topography of spontaneous reflex passive and conditioned eyelid responses have been described and quantified in different species including humans. Neuronal centers involved in lid responses have been determined and the electrical activity in both *in vivo* and *in vitro* studies.

Nevertheless, the neuronal centers where classically conditioned eyelid responses are learned and/or stored have been a matter of continuous debate for the past four decades. In particular, cerebellum, hippocampus, and other cerebral cortical structures have been implicated in a wide variety of learning and memory experimental paradigms.

The symposium will address this exciting issue with a comparative and multidisciplinary approach. Studies in different species and using different technical approaches will be considered. Experiments involving the main cerebral structures proposed to be the site of motor learning and/or memory storage will be presented.

Endothelial Cellular Response to Altered Shear Stress

APS Respiration Section

Aron B. Fisher and Paul Schumacker

P.F. Davis, S. Chien, A.B. Fisher, A.I. Barakat, and P.T. Shumacker

There is increasing evidence that many cell types sense and respond to physical stimuli. This is especially the case with endothelial cells which are normally exposed to the flowing blood and which are now known to exhibit cellular responses to shear stress. These responses may have importance in a broad variety of major diseases. For example, atherosclerosis and other vascular changes may be secondary in part to increased or altered patterns of shear. Loss of shear with ischemia due to embolism or thrombosis may contribute to the pathophysiology more commonly associated with tissue anoxia. This symposium proposes to present the cellular adaptation and changes that occur with alteration to shear stress in endothelial cells. The presentations will include the use of pulmonary-derived endothelium, as well as endothelium derived from other sites. To date no major qualitative differences have been described for the response to shear among the various endothelial preparations. Peter Davies will describe the adaptation of endothelial cells in culture to initiation of flow. Then with emphasis on gene induction, Shu Chien will describe the signaling events associated with increased shear stress. Aron Fisher will describe the signaling events that will occur with loss of shear stress in flow adapted endothelial cells. Abdul Barakat will present data related to the role of ion channels and cytoskeletal elements as the

shear stress sensors and Paul Schumacker will present data related to the role of mitochondria as transducers of mechanical strain. Thus, this symposium will present the cellular responses to both increased and decreased stress and will consider the roles of various sensors and transducers of the mechanical events.

Respiratory Physiology of the Pharyngeal Airway: Modulation by Skeletal Muscle Activities, Central Nervous System State, and Disease

APS Respiration Section

Ralph F. Fregosi and Samuel T. Kuna

R.F. Fregosi, S.T. Kuna, R. Lyric, S.C. Veasey, and A.R. Schwartz

Coordinated motor control of the pharyngeal airway is required for normal speech, swallowing, and breathing. While motor control of all pharyngeal behaviors is important to understand, control of pharyngeal airway geometry and compliance presently receives considerable interest because of several prevalent forms of sleep-disordered breathing, including obstructive sleep apnea and sudden infant death syndrome. Common to several forms of sleep-disordered breathing is patency of the upper airway in wakefulness and a loss of this patency in sleep. Coincident with a loss of airway patency is a reduction in upper airway dilator muscle activity. Indeed activity of upper airway motoneurons is highly dependent on behavioral state. Thus, for obstructive sleep apnea there are two hotly investigated areas of science: first, mechanisms employed in the maintenance of a patent upper airway in wakefulness; and second, the mechanisms involved in the loss of this patency. Scientists with many different backgrounds have been exploring components of these two broad research areas. In recent years scientists interested in upper airways physiology and neural control have presented their work in diverse society meetings, such as those sponsored by the American Thoracic Society, the Society for Neuroscience, FASEB, and world-wide sleep meetings. This program is designed to bring these scientists together into one venue. In the symposium, Fregosi and Kuna will discuss new ideas regarding the role of pharyngeal muscle activities in the control of pharyngeal airway geometry and compliance with a major focus on the pharyngeal constrictor and tongue muscles, respectively. Lydic will then present new information on the molecular mechanisms underlying pontine neuronal activities that control sleep state and respiratory motor output. Veasey will discuss the role of neurochemicals in controlling the various groups of respiratory motoneurons and the sleep-state dependency of this control. The symposium will conclude with Schwartz's overview of pharyngeal airway function in patients with the obstructive sleep apnea syndrome,

including the physiological basis of novel treatment approaches. Thus, this symposium should attract broad participation by scientists with interests in the control of breathing pharyngeal physiology, the control of sleep state swallowing, and airway disease.

Experimental Gene Delivery and Therapy: A Tutorial

Craig H. Gelband

C.H. Gelband, C.D. Sigmund, K. Campbell, K. High, J. Engelhardt, and T. Flotte

The area of gene therapy and/or transfer is one that is expanding tremendously. Gene therapy is being used both clinically and experimentally for treating diseases of a number of different physiological systems. These include diseases of, but not limited to, the cardiovascular system, nervous system, lung, and gastrointestinal tract. In this workshop an overview of the use of gene therapy tools will be presented by Barry Byrne. Terry Flotte will speak of the use of gene therapy to treat lung disorders including cystic fibrosis. John Engelhardt will focus on gene delivery and therapy for ischemia/reperfusion injury. Kathryn High will discuss gene therapy tools for blood disorders. Finally, Kevin Campbell will discuss gene therapy for muscular disorders.

Combined Impact of Temperature and Exercise Stress on the Physiological Response to Toxic Agents

APS Environmental and Exercise Physiology Section

Christopher J. Gordon and J.J. Steinberg

C.J. Gordon, J.J. Steinberg, J. Mercer, W.P. Watkinson, W.J. Mautz, and D.B. Miller

Nearly all toxicological and pharmacological studies are performed with resting subjects under stable environmental conditions in which ambient temperature, relative humidity, photoperiod, and other environmental variables are maintained under standard conditions. However, this standard environment is clearly not representative of the fluctuations in the natural environment encountered by humans and animals on both a daily and annual basis. The standard test environments generally fail to assess the effects of work, exercise activity, and other behavioral choices that may substantially alter physiological responses to environmental toxicants. The physiological response to toxicants may be markedly affected when these environmental variables deviate from standard conditions. Furthermore, extrapolating toxicological effects from experimental animals to humans who are exposed to varied environmental and working conditions is clearly prob-

lematic without information on the responses of experimental animals under similarly stressful conditions.

This session will offer a multidisciplinary approach to this topic by focusing on research that deals with the effects of temperature and exercise stress on the physiological response to toxicants. Temperature and exercise are closely related environmental physiology topics. Higher ambient temperatures limit the efficiency and duration of exercise, while heat production from exercise raises body temperature, which further compromises exercise and work capacity, especially in warm environments. Deviations in air temperature with and without the occurrence of exercise are likely to be key factors that compromise physiological responses to toxic agents. The speakers are selected from fields that address the effects of environmental and exercise stress on a range of salient physiological topics including cellular/molecular biomarkers (Miller), pulmonary function (Mautz), cardiovascular function (Watkinson), thermoregulation (Gordon), and epidemiological studies on human health and mortality (Mercer). The material will be presented with emphasis on providing impetus for future studies on the interactions between environmental physiology and physiological response to toxic agents.

Physiology-in-Focus: Neurotransmitters in Cardiovascular Regulation: Glutamate

Frank J. Gordon

F.J. Gordon, A.C. Bonham, H.N. Sapru, and A.F. Sved

The simple amino acid L-glutamate is perhaps the most ubiquitous, fast excitatory neurotransmitter in the central nervous system. It has been more than twenty years since a functional role for L-glutamate as a neurotransmitter of central cardiovascular regulation was first proposed. Since that time, studies of central autonomic regulation have played a prominent role in establishing the significance of glutamatergic neural transmission in mediating integrated physiological responses produced by the brain and spinal cord. Symposium speakers will trace the development of this research area, present experimental results contributing to our current understanding of glutamatergic mechanisms, and address new and emerging concepts that will be important for future research.

Potassium Channels that Regulate Vascular Tone: Which are the Major Players?

APS Cardiovascular Section

David Gutterman and Joseph Hume

D. Gutterman, J. Hume, S. England, T. Saito, J. Brayden, Y. Liu, and A. Gurney

Endothelium-derived hyperpolarization factor (EDHF) plays an active role in vasomotor responses primarily in

smaller resistance arteries. EDHF-mediated dilation involves the opening of potassium channels in the sarcolemmal membrane of vascular smooth muscle cells and endothelial cells. With a variety of pharmacological, electrophysiological, and molecular tools for interrogating potassium channel function and structure, we are able to understand better the various properties of potassium channels and mechanisms of vasodilation to stimuli such as hypoxia, ischemia, pharmacological agents, and mechanical stimuli including, shear and myogenic responses. However, as our understanding of hyperpolarization-mediated dilation increases, the complexity of the potassium channel involvement increases as well. The symposium is designed to provide an overview of potassium channel structure, highlight novel observations regarding the role of potassium channels in regulating vascular function, and provide insights into the effects of disease on K-channel activity as it relates to altered vasomotor function. The focus will be on three major classes of vascular potassium channels; calcium-activated potassium channels, ATP-sensitive potassium channels, and voltage-dependent potassium channels.

Physiology, Pathophysiology, and Genetics of Body Weight/Adiposity Regulation

Society for Experimental Biology and Medicine

Peter J. Havel and Barbara Horwitz

P.J. Havel, M.W. Schwartz, S. Collins, L. Rossetti, P. Froguel, and B. Horwitz

With its increasing prevalence, obesity has become a major and costly medical problem primarily due to related cardiovascular disease and type 2 diabetes. This symposium will discuss the afferent, central, and efferent pathways by which body adiposity is regulated and will present examples in which obesity results from dysregulation of these pathways. Numerous neural and humoral signals from the gastrointestinal tract, pancreas, liver, and adipose tissue convey to the central nervous system (CNS) afferent information about recent energy intake, as well as peripheral energy stores. Among these are insulin and leptin, which act as long-term signals to the brain and that regulate energy balance such that under free-feeding conditions body weight/adiposity are maintained within a relatively narrow range. Both insulin and leptin influence the activity of hypothalamic circuits involving signaling molecules such as neuropeptide-Y, melanocortins (α -MSH), and endogenous melanocortin receptor antagonist (agouti-related protein), melanocyte concentrating hormone, cocaine, and amphetamine related transcript and the orexins, such that energy intake is matched to energy expenditure over time. Energy expenditure and nutrient fluxes are regulated by sympathetic neural pathways via activation of adrenergic receptors and at least in some cases of mitochondrial uncoupling proteins. These autonomic pathways are influenced by the same neuropeptide-containing circuits that regulate food

intake that can influence metabolic fluxes (nutrient partitioning) between the liver, muscle, and adipose tissue and that can potentially affect insulin secretion and action. Dysregulation of afferent, central, or efferent pathways involved in the control of body weight/adiposity can lead to the mismatches between energy intake and energy expenditure that cause obesity. For example, mutations of genes encoding leptin or the leptin receptor, the melanocortin precursor POMC or CNS melanocortin receptors each lead to hyperphagia and massive obesity in humans as well as in rodents. A detailed understanding of the physiology, pathophysiology, and genetics of these regulatory systems is critical for the development of new approaches for treating obesity and its sequelae.

Lung Surfactant and Reactive Oxygen/Nitrogen Species: Antimicrobial Activity and Host/Pathogen Interactions Within the Lung

APS Respiration Section

Judy Hickman-Davis

F.C. Fang, J.M. Hickman-Davis, C. Nathan, V.L. Shepherd, D.R. Voelker, and J.R. Wright

The respiratory tract is exposed to a multitude of toxic and infectious agents on a regular basis and yet in the healthy lung, disease is a relatively rare event. Innate immunity of the lung includes ciliary (mechanical) clearance, cough reflex, and cellular mechanisms. Within the alveolar lining, fluid surfactant proteins provide a first line of defense against invading organisms before the development of specific immunity. Surfactant proteins SP-A and SP-D are hybrid molecules termed collectins that belong to the Ca²⁺-dependent animal lectin superfamily. The collectins are ideally suited to the role of first line defense in that they are widely distributed within the lung capable of antigen recognition and can discern self versus non-self. These proteins recognize bacteria fungi and viruses by binding mannose and *N*-acetylglucosamine residues on microbial cell walls. SP-A and SP-D have been shown to stimulate the respiratory burst, as well as nitric oxide synthase expression by alveolar macrophages. Superoxide produced by the membrane bound NADPH-oxidase of macrophages combines with nitric oxide ($\cdot\text{NO}$) to form the oxidant peroxynitrite at near the diffusion limit for these two molecules. While $\cdot\text{NO}$ is a well-recognized microbicidal molecule of macrophages the mechanism(s) by which NO contributes to host defense remain undefined. $\cdot\text{NO}$ may have a direct microbicidal effect through: 1) reaction with iron or thiol groups on proteins forming iron-nitrosyl complexes that inactivate enzymes important in DNA replication or mitochondrial respiration; 2) formation of such reactive

oxidant species as peroxynitrite; 3) interaction with the hydroxyl radical ($\cdot\text{OH}$) to induce double strand DNA breakage; or 4) inhibition of antioxidant metalloenzymes such as catalase thereby increasing hydrogen peroxide (H_2O_2) and $\cdot\text{OH}$ concentrations. In general, the understanding of pulmonary host defense mechanisms lags behind that of other systems. Because of the poor accessibility and importance in defense against bacterial infections, it may be possible to develop practical therapies or to increase the lungs protective capacity though a better understanding of the role of surfactant proteins and reactive oxygen and nitrogen species in the early immune response.

Adaptive Regulation of Epithelial Solute Transporters

APS Gastrointestinal Section

Barry H. Hirst and Ronaldo P. Ferraris

B. Shneider, S.P. Shirazi-Beechey, H.M. Said, R.P. Ferraris, and B.H. Hirst

The molecular identification of membrane proteins involved in transcellular assimilation of organic solutes, such as those involved in macro- and micro-nutrient transport in the gut, enables the investigation of adaptive regulation of these transport systems at the molecular level. Thus, transcriptional as well as post-transcriptional and post-translational mechanisms may now be defined. These studies, although at an early stage, are ripe for discussion. The symposium will illustrate adaptive regulation, in particular, in response to substrate availability of a variety of transport systems. While the focus is on the gastrointestinal (including hepatic) system, lessons extend into all epithelial systems and beyond where nutrient transport and its regulation are issues.

Physiological Genomics: Activity-sensitive Gene Regulation in Muscle

APS Environmental and Exercise Physiology Section

David A. Hood

D.A. Hood, R.T. Lee, K. Esser, M. Hamilton, and F. Booth

Microarrays are relatively new molecular techniques that can be used to assay for the differential expression of thousands of mRNAs at the same time. In addition to this advantage (as opposed to Northern analysis where only a handful of mRNAs are determined in a single lab), microarrays provide an unbiased examination of mRNAs. In the past the investigator selected the specific mRNAs based upon bias of previous results while microarrays made with thousands of mRNAs provide unplanned comparisons. Further, these unplanned comparisons not only lead to unexpected results, but these findings provide the foundation for previously

unthought of hypotheses. This symposium will synthesize the existing state-of-the-art in microarray analysis concerning the responses of mRNAs to alterations in mechanical and contractile activity on muscle.

Both Esser and Lee have employed microarrays to examine alterations in mRNAs following increases in mechanical load. By applying a highly uniform biaxial cyclic strain to cultured smooth and cardiac muscle cells, Lee used DNA microarray technology to describe the transcriptional profile of mechanically induced genes. Likewise delineation of the molecular response to altered loading of skeletal muscle is unknown. Esser used microarray technology to identify mRNAs changing in response to a bout of weight-lifting by rats. Previous studies had shown that this model led to skeletal muscle hypertrophy. Hamilton examined altered mRNA expression after removing weight-bearing from the soleus muscle, a model which not only induces skeletal muscle atrophy, but which changes the profile of genes associated with cardiovascular diseases. Booth will present a microarray analysis of the differential mRNA expression between two fiber types of skeletal muscle. He will also discuss future usages of microarray in physiological genomics.

Structure and Gating of Epithelial Ion Channels

APS Epithelial Transport Group

Thomas Kleyman

D. Dawson, D. Gadsby, L. Palmer, D. Eaton, and T. Kleyman

Epithelial cell layers have discrete plasma membrane domains that allow for the vectorial transport of solutes between the lumen (for external environment) and the interstitial space (internal environment). Apical plasma membrane ion channels have key roles in the transepithelial secretion of Cl and K and in the transepithelial reabsorption of Na. This symposium brings together investigators whose work has focused on the structure and gating of three epithelial ion channels; CFTR, ROMK, and ENaC. These channels have critical roles in fluid secretion and in extracellular fluid volume and K homeostasis. David Dawson and David Gadsby will discuss the structure of the CFTR pore and regulation of CFTR gating. Lawrence Palmer will discuss the role of the ROMK pore in K channel gating. Douglas Eaton will discuss regulation of ENaC gating. Thomas Kleyman will discuss the structure of the ENaC pore and its role in channel gating.

Workshop: Integrative Approaches for the Study of Physiological Function in Genetically Altered Mice

John N. Lorenz and David L. Mattson

J.N. Lorenz, D.L. Mattson, P. Kubes, W. Mitzner, D. Bernstein, and C. Ahn

The availability of genetically-altered mouse models has led to the development of a wide variety of in vitro and in

vivo methodologies for studying the functional consequences of specific gene alterations. Over recent years symposia on cardiovascular techniques for specific use in the mouse have become rather commonplace at scientific meetings, and as a result, many laboratories have begun to incorporate these methodologies into their arsenal of techniques. While much attention has been given specifically to the study of cardiovascular function in mice (blood pressure, cardiac output, left ventricular performance) less has been paid to the study of other organ systems or of integrated function. This symposium will discuss integrative techniques for the evaluation of functional phenotype in a wider variety of organ systems for which useful mouse models already exist and also to discuss future directions in this area. Four speakers will participate in this symposium: 1) Paul Kubes will discuss advances in the study of GI physiology in the mouse; 2) Wayne Mitzner will discuss techniques in the study of pulmonary physiology and lung mechanics in the intact mouse; 3) Daniel Bernstein will discuss approaches to evaluate metabolism and integrative cardiovascular function in the mouse; and 4) Chong Ahn will discuss the biological application of chip-based microelectromechanical systems (BioMEMS) to physiological study. In addition we also anticipate that the two co-chairs for this session (John Lorenz and David Mattson) will present an introduction reviewing some of the current techniques used in the study of cardiovascular and renal physiology in the mouse.

Effect of Changes in Blood Pressure on Renal Transporters

APS Renal Section

Alicia McDonough

P. Persson, A.A. McDonough, K.-P. Yip, and S. Masilamani

It has been recognized for decades that regulation of sodium transport is critical for the maintenance of normal extracellular volume and blood pressure and that renal function is altered in hypertension. Alterations fall into two categories: those responsible for the hypertension (such as elevated sodium transport in the cortical collecting duct) and homeostatic compensations important to match sodium output to sodium intake. Regarding the latter, the phenomenon whereby an increase in arterial pressure provokes an increase in sodium excretion, is known as pressure-natriuresis. In human hypertension, as in all genetic rat models of hypertension, the homeostatic set point is elevated and the pressure-natriuresis response is blunted. Since this response can occur in the absence of a change in GFR it involves a decrease in net tubular sodium reabsorption. Until recently, very little was understood about the cellular mechanisms responsible for the natriuresis during acute or chronic hypertension. We now know that acute hypertension provokes sodium transporter internalization from the apical brush border and sodium pump inhibition and that chronic hypertension can lead to decreases in

sodium transporter abundance. This symposium aims to review and discuss recent studies addressing the molecular mechanisms responsible for sensing changes in blood pressure and adjusting renal sodium transport accordingly.

Genetic Modification of Calcium Handling Proteins in Heart Disease: Insights, Roadblocks and Potential Therapies

APS Cardiovascular Section

Joseph M. Metzger

E. Kranias, R. Hajjar, J.M. Metzger, and M.V. Westfall

This symposium focuses on the mysteries of cardiac EC coupling and sarcomere function in health and disease. The control of sarcomere function begins with Ca²⁺-mediated regulatory events and ends with a chemomechanical transduction event involving the docking of the molecular motor myosin on actin. In considering the multitude of proteins involved and their unique assembly it can then be appreciated that the control and regulation of sarcomeric function represents one of the most elaborate intracellular signaling pathways in biology. A growing arsenal of genetic-based tools in concert with technological advances in functional assays offers new opportunities to understand sarcomere function at the cellular tissue and whole organ levels. This symposium will highlight these advances including recent studies employing transgenesis mutagenesis gene targeting and viral-based somatic cell gene transfer to reveal some of the long-held secrets of cardiac EC coupling and sarcomere function in normal and failing hearts. This symposium will also bring to light new therapeutic approaches to systematically modify heart function under (patho) physiological conditions in vivo.

Workshop: Tissue Engineering: Opportunities and Challenges

Robert M. Nerem

R.M. Nerem, M.J. Lysaght, R.D. Ratner and J.R. Morgan

Tissue engineering is an emerging technology which represents the next generation of medical implants. The goal is to create biological substitutes and/or foster tissue regeneration with the purpose being to replace, repair, maintain, or enhance tissue/organ function. With the emergence of this technology, there is an emerging industry. Although a fledgling one today, it is predicted to have the potential of reaching more than \$50 billion annually. To realize this potential there are enabling core technologies which must be developed. These range from cell technology all the way up to an integration as a biologic system and these can best be addressed by multidisciplinary teams. Through this series of presentations the challenges that are presented by tissue engineering will be examined. These represent opportunities for

the future for those in the life sciences and in biomedical engineering.

Genomics and Molecular Basis of Exercise and Environmental Physiology: Molecular Control of Thermogenesis

US Army

P. Darrell Neuffer

P.D. Neuffer, J.E. Friedman, A.G. Dulloo, G. Argyropoulos, and W.W. Winder

Thermogenesis by definition is the use of energy to produce heat within an organism. Survival in the cold for many types of animals requires the regulation of thermogenesis. In humans control of thermogenesis is believed to be an important determinant of basal metabolic rate and overall metabolic balance. We will review the current state of knowledge regarding factors that may be controlling thermogenesis and metabolic rate in humans at the cellular and molecular levels. Additionally evidence suggesting that AMPK activity may play a role in sensing metabolic demand with the cell will be presented.

How Does the Brain Understand Muscle Mechanics?

APS Central Nervous System Section

T. Richard Nichols and James C. Houk

T.R. Nichols, C.J. Heckman, M.H. Schieber, S.H. Scott, and J.C. Houk

Coordinated movement in biological organisms has resulted from the co-evolution of the musculoskeletal and central nervous systems. The phylogenetic relationship between these two systems suggests that the organization and dynamic properties of neural circuits reflect the structure and kinetic properties of the musculoskeletal system, as well as the mechanical constraints imposed by the environment. Physiologists interested in the neural control of motor function have been aware of this relationship for well over 100 years and some of these individuals have made significant contributions to musculoskeletal anatomy and physiology. The growing interdisciplinary nature of physiological research has provided an environment in which the study of interactions between neural and muscular systems can flourish. Contemporary research in motor systems has provided new insights into these interactions and the manner in which musculoskeletal organization is represented centrally.

The manner in which these two physiological systems bring about coordinated movement is the subject of this symposium. The participants have been chosen because they have made substantial contributions not only to the understanding of neural mechanisms of motor coordination, but also to mus-

culoskeletal physiology. Nichols will briefly review past contributions to the neuro-mechanical basis of movement and more recent work on the regulation of posture by circuits in the spinal cord. Heckman will discuss the manner in which cellular properties of motoneurons complement the mechanical properties of muscle units. Schieber will discuss the control of the digits in primates in terms of the appropriate muscular organization and cortical organization. Scott will discuss the physical problems of multi-joint coordination, the manner in which this coordination is brought about by cortical mechanisms. Finally Houk will discuss models of central mechanisms and muscular dynamics that have been designed to explain the control of reaching and grasping.

Controversial issues, such as the existence of internal models and maps, will be discussed. New approaches, both methodological and theoretical, that will be required to advance this field will also be addressed.

Interplay Between Nitric Oxide and Hemoglobin: Current Concepts

APS Cross Sectional Committee

Rakesh P. Patel and Matthew B. Grisham

R.P. Patel, J.S. Stamler, J.R. Lancaster, and J. Olson

The role of nitric oxide (NO) in numerous physiological and pathological processes is widely documented. There is compelling evidence indicating that under physiological conditions NO has key functions in maintaining vascular homeostasis and preventing vascular injury. However, our knowledge regarding how NO function is regulated in the vascular compartment remains poorly defined. These are key issues, elucidation of which will provide important insights into the mechanisms that lead to vascular injury during diseases, such as atherosclerosis or damage incurred during ischemia-reperfusion injury. The focus of this symposium is on a specific area of regulation of NO biology involving reactions with hemoglobin (Hb). Early thinking was that NO reactions with erythrocytic Hb are restricted to the proteins heme groups and this represented a safe route to detoxify and remove NO produced from the endothelium. However, recent studies suggest that NO reactions with circulating red blood cells are more complex than previously thought with the hypothesis put forward that Hb regulates NO function in vivo. The interactions between NO and Hb are also critical to understand if a Hb based blood substitute is going to be beneficial in the clinic. Rakesh Patel will introduce the symposium with an overview of Hb and NO biochemistry and how this impacts on vascular function both under physiological conditions of blood flow and when cell free Hb is introduced into the system. Jonathan Stamler will present his seminal observations which

have led to the controversial hypothesis that Hb modulates blood flow via the intermediate formation of S-nitroso-Hemoglobin, a novel derivative in which a specific cysteine residue on the β -chain (B93Cys) is nitrosolated. Rakesh Patel will then discuss the effects of S-nitrosation of Hb on the vascular functions of NO. Jack Lancaster will discuss the effect the red blood cell has on Hb-NO interactions. John Olson will discuss the insights gained from specific amino acid mutations on reactions of NO with Hb.

Nutritional Neuroscience

Assoc. of Latin American Physiology Societies

Lucimey Lima Perez and Leon Cintra

R.C. Guedes, C. Prasad, L. Cintra, and L. Lima Perez

The symposium will cover some aspects concerning the influence of nutrition on physiological functions of the central nervous system. The subjects covered by the speakers will be the following: 1) The organization of the circadian rhythmicity and the suprachiasmatic nuclei and rehabilitation of CA3 hippocampal pyramidal cells in malnourished rats. 2) The effect of mild protein prenatal malnutrition, the release of noradrenaline, and the density of neurons in the rat cortex. 3) Spreading depression in rats submitted to short periods of malnutrition during lactation period. 4) The influence of micronutrients such as taurine during development and regeneration of the central nervous system. 5) The neurobiology of food, mood and health.

Mitochondria and Energy Metabolism in Heart Failure, Hypertrophy, and Remodeling

APS Cardiovascular Section

Michael A. Portman

J. Zhang, J. Taegtmeier, M.A. Portman D.P. Kelly, and Craig Malloy

Mitochondria appear to arbitrate the complex signaling cascades which promote apoptosis and cell death. Thus, interest in mitochondrial integrity and function has been reinvigorated over the past year. Furthermore, mitochondria also seem to play a significant role in myocardial remodeling during heart failure and hypertrophy.

During heart failure, patterns of gene and protein expression, as well as substrate preference and high energy phosphate kinetics, resemble those apparent in the developing heart. This symposium will review recent findings and issues related to mitochondria function during development hypertrophy and remodeling.

Intermittent Hypoxia: Cell to System

APS Hypoxia Group

Nanduri R. Prabhakar and Eugene Fletcher

N.R. Prabhakar, R.D. Fields, G. Adhikary, T. Baker, and E. Fletcher

Intermittent hypoxia (IH) is an intriguing pathophysiological situation associated with many clinical conditions, including sleep apneas, apneas in premature infants, and lung diseases (e.g., COPD asthma pulmonary fibrosis). IH has long term effects on the cardio respiratory systems, leading to hypertension and ventilatory abnormalities in humans and experimental animals. Studies have begun addressing the impact of IH on cellular processes. Evidence emerging suggests that IH is a more potent stimulus for activating gene expression than sustained hypoxia. Proteins encoded by the genes might contribute to cardio-respiratory abnormalities associated with IH. The purpose of the symposium is to bring together scientists that work on molecular mechanisms, as well as cardio-respiratory responses to IH in experimental animals, as well as humans. The symposium will begin with an overview by Fields who will discuss the fundamental mechanisms of gene expression and second messenger changes in neuronal cells in response to cyclical stimuli and how they differ from sustained stimulus. Adhikary will present the evidence for involvement of distinct cellular mechanisms associated with gene expression by IH in isolated cells and intact animals. Baker dwells on the impact of IH on respiratory system with an emphasis on the role of spinal protein synthesis in respiratory plasticity induced by IH. Fletcher will deal with cardio-respiratory responses to IH in humans, as well as in experimental animals and the potential mechanisms contributing to these alterations. Given the potential clinical implications of IH, it is hoped that this symposium provides impetus for further progress in this emerging area.

The Role of the Cell Membrane in Regulating Excitability and Contractility During Exercise and Fatigue

APS MyoBio Section

Jean-Marc Renaud and Thomas Nosek

J.-M. Renaud, T. Clausen, D. Allen, P. Backx, and T. Nosek

During exercise, muscles must maintain their membrane excitability and this is mainly accomplished by activating the Na⁺ K⁺ pump. However, when the amount of energy (i.e. ATP levels) in muscle fibers starts to decrease then the K⁺(ATP) channels become activated and one of their postulated functions is to reduce membrane excitability. This then reduces the amount of calcium released by the sarcoplasmic reticulum and eventually forces development in order to reduce ATP utilization. A decrease in ATP levels may also

reduce the activity of the L-type calcium channels which are not only ATP sensitive but are involved in the signaling between the action potential and calcium release. Thus, the cell membrane plays important roles during exercise. It must maintain its own excitability to maximize muscle performance until the energy reserves start to be depleted. At that point the reverse must occur and membrane excitability must decrease. The objective of the symposium is to engage a discussion on how the cell membrane plays such crucial roles during exercise and fatigue development.

Mechanical Modulation of Gene Expression in the Musculoskeletal System: From Nucleus to Organism

Biomedical Engineering Society

Clinton Rubin

C. Rubin, F. Guilak, D. Ingber, J. Rubin, T. Gross, and S. Judex

The mass and morphology of the musculoskeletal system is strongly influenced by mechanical stimuli. At the organismal level there is a great deal of experimental evidence which demonstrates that removal of function will lead to disorders such as sarcopenia and osteopenia while brief exposure to specific parameters within the mechanical milieu can be strongly anabolic. Clearly a better understanding of the molecular mechanisms which control the balance between form and function in the musculoskeletal system may lead to new interventions for the acceleration of fracture healing, the promotion of osseointegration, the inhibition of osteoarthritis, and the reversal of osteoporosis. In this session the mechanical sensitivity of various cells and tissues within the musculoskeletal system are examined in a hierarchical fashion with the goal of demonstrating that even small mechanical stimuli can result in massive changes in cell, tissue, and organ morphology.

Renal and Comparative Physiology of Urea Transporters

APS Renal Section

Jeff M. Sands and Mark A. Knepper

J.M. Sands, M.A. Knepper, S.M. Bagnasco, J.B. Wade, D.M. Cohen, and P.A. Wright

Urea transporters play an important role in the urine concentrating mechanism. Several facilitated urea transporters have been cloned from mammalian kidney and from erythrocytes, raising the intriguing question as to why the kidneys need so many urea transporters. Urea transporters have also been cloned from elasmobranchs and amphibian species. Their conservation through evolution suggests that they play an important physiologic role. Thus, the overall goal of this

symposium is to bring together speakers addressing various aspects of the regulation of urea transporters in the mammalian kidney and in other species since an understanding of the comparative and evolutionary aspects of urea transporters may aid our understanding of their role in renal function. The first speaker, Serena Bagnasco, will discuss the genetic organization of the UT-A urea transporter family and transcriptional control of its various isoforms. The second speaker, Jim Wade, will discuss the intra-renal localization of the UT-A protein isoforms and the regulating of these proteins. David Cohen will discuss the role of urea in permitting the inner medulla to adapt to osmotic stress. Pat Wright will discuss the comparative physiology of urea transporters, including the cloning of UT-A-like urea transporters in elasmobranchs and evolution of urea transporters and urea cycle enzymes.

Genomics and Molecular Basis of Exercise and Environmental Physiology: Molecular Response to Hypoxia

US Army

Larry Sonna

L. Sonna, G. Semenza, A. Choi, C. Clerici, and R.A. Johns

How do cells respond to hypoxic stress such as that which occurs at high altitude? Three lines of investigation will be reviewed: Hypoxia-inducible factor-1 (the first transcriptional factor shown to be induced by hypoxia), the heme-oxygenase system, which is induced in a number of tissues in response to hypoxia, and the sodium transport systems of lung which may play a role in high-altitude pulmonary edema. Additionally, we will review the effects of hypoxia on nitric oxide synthase.

Engineering Islet Cells for Cell Therapy of Diabetes Mellitus

Sociedad Espanola Ciencias Fisiologicas

Bernat Soria and Christopher B. Newgard

B. Soria, C.B. Newgard, S. Bonner-Weir, and J.V. Sanchez-Andres

Pancreatic islets are neuroendocrine organs which control blood glucose homeostasis. The precise interplay of a heterogeneous group of cell populations (β , α , δ and PP cells) results in a fine-tuned release of counterbalanced hormones (insulin, glucagon, somatostatin, and pancreatic polypeptide). Under the premises of a detailed knowledge of the physiological basis underlying this behaviour two lines of work might be inferred: 1) generating computational and operational models to explain and predict this behaviour and 2) engineering islet cells to reconstruct pancreatic endocrine function. Whilst the former is fueled by new computational

strategies giving physiologists the possibility to model a system in which new "emergent" properties appear, the later benefits from the useful tools and strategic knowledge achieved by molecular, cell, and developmental biologists. This includes using tumor cell lines, engineering islet cell precursors, differentiation, regeneration and growth, and, finally, therapeutic cloning of human tissues. Gaining deep physiological understanding of the basis governing these processes is instrumental in order to engineer new pancreatic islets.

Model Organisms: Functional Genomics of Membrane Transport

APS Cell and Molecular Physiology Section

Kevin Strange

K. Strange, C. Montell, M. Driscoll, and R. Rao

"Functional genomics" is defined as the assignment of function to identified genes and, importantly, the elucidation of the organization, integration, and control of gene networks that give rise to specific physiological processes. It is widely recognized that the intellectual and technical challenges posed by attempts to define the genetic basis of physiology necessitate the study of less complex "model organisms." Speakers in this symposium will describe the use of yeast, *Caenorhabditis elegans*, and *Drosophila melanogaster* to characterize the physiological functions, regulation, and structural aspects of ion channels and transporters.

Bioinformatics in Biology and Engineering

Biomedical Engineering Society

Shankar Subrmaniam

S. Subrmaniam, L. Loew, and J. Bassingthwaite

The past decade has witnessed a large paradigm shift in biology. The ability to study biological systems at microscopic scales in finer levels of detail has provided a wealth of information about the complexity underlying biological phenomena. Additionally the advent of the genome projects has transformed biology in a fundamental way into an information-driven science. There are two emergent themes from this revolution: first, complexity is the hallmark of biological systems and second, the coupling between size and time scales of biological phenomena are not hierarchical. These themes make it a very challenging task to link the microscopic and macroscopic descriptions of biology.

The genome of an organism provides the blueprints for its life and functioning. Deciphering how this blueprint is implemented is a complex task which involves a new version of the central dogma where the genome contains the code for gene products which induce physiological functioning through couplings and interactions amongst themselves and surround-

ings. Finally, this has serious implications for the macroscopic picture of physiology.

All of the codes and mechanisms by which the code functions are information accessible to modern biochemical and biophysical measurements. The task of decoding this information is arguably the biggest challenge faced by modern biology. Even for the simplest prokaryotic cell the genome is tens to hundreds of million base pairs long. Small changes in the genome are responsible for variant function (such as altered metabolism). Both detection and processing of this polymorphism is of fundamental importance in biology and medicine.

This session will focus on areas in the crossroads of biology informatics and engineering.

Russian and Eastern-Block Physiologist: Recognition Because of Pre-World War II and Cold War Conditions

APS History of Physiology Group

Charles M. Tipton and G. Edgar Folk Jr.

C. Tipton, A. Viru, R. Victor, S. Bonting, G. Folk

The purpose of this symposium is to “educate and remind” the APS membership of select and important scientific contributions made by Russian physiologists from before World War II to after the Cold War. The rationale for the symposium is that the lack of recognition citation or familiarity with various Russian accomplishments occurred in part because political conditions between the United States and Russia did not facilitate scientific interactions or informational exchanges. The areas of physiology that appear to be most affected by these circumstances are the ones (exercise and endocrinology) that encompass stress physiology. Consequently the renown scholar of exercise endocrinology, Atko Viru, from the University of Tartu in Estonia has been invited to be a featured speaker on this specific subject using his personal and professional knowledge of Russian scientists in this area. A tangential area related to the topic of Viru is the role of the sympathetic nervous system in the prevention of muscular fatigue. Ronal Victor from Southwestern Medical School is to discuss select Russian physiologists whose findings are generally unknown by current investigators and authors. Despite token efforts by both countries to promote scientific interactions, political ideologies inhibited open exchanges between space scientists. Sjoerd Bonting of the University of Nijmegen in the Netherlands, who had intimate knowledge of the Russian space program, will address this aspect as it related to individual Russian space scientists. A short question and answer session will follow these presentations.

Protein-Protein Interactions in Signal Transduction

APS Renal Section

Edward J. Weinman and Shirish Shenolikar

M. Colledge, T. Bretscher, E.J. Weinman, P.A. Welling, and S. Shenolikar

Emerging evidence indicates that the localization and function of many membrane proteins rely on the assembly of multiprotein complexes that link these plasma membrane proteins to the underlying cytoskeleton. Recent studies make a compelling argument in favor of multiprotein complexes in the physiological regulation of ion transporters in renal and other epithelial tissues. Such studies demonstrate a key role for PDZ-domain containing adapter proteins in the hormonal regulation of several renal ion transporters. Further work has expanded the role for the protein adapters to the targeting, trafficking, or sorting of G-protein-coupled receptors and signal transduction by receptor tyrosine kinases and other signaling molecules. This symposium will review the function and organization of signaling complexes in polarized cells and emphasize the importance of adapter proteins in bringing together signaling proteins and their substrates and thereby imposing the remarkable specificity of signal transduction in neurons and epithelial cells.

Life, Sex, and Death: The Physiological Basis of Life-History Traits and Trade-Offs

APS Comparative Section

Tony D. Williams and Barry Sinervo

T.D. Williams, N. Metcalfe, R.J. Nelson, M.R. Rose, M. Wikelski, and B. Sinervo

Fisher (1930) a doyen of evolutionary biology was the first to highlight the importance of an understanding of physiological mechanism to life-history and this point has subsequently been repeated by many evolutionary biologists (e.g., Winkler 1985; Bernardo 1996; Ricklefs 2000). Stearns (1992) stated that “physiology contributes insight into the mechanisms that cause trade-offs” (p.14) and that “physiological trade-offs are involved in almost all micro-evolutionary trade-offs” (p.75). Despite this recognition of the importance of considering physiology in life-history studies, the physiological basis of most if not all trade-offs remains unknown. Indeed much current life-history theory is divorced from physiology and other components of organismal biology (Bernardo 1996). The development of the field of “evolutionary physiology” (sensu Garland and Carter 1996) has led to significant and very productive integration of physiology and evolutionary biology. However, to date, much of this

Experimental Biology 2001

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work has focused on performance-related traits (e.g. sprint speed, maximum sustainable metabolic rate) rather than life-history traits per se. Stearns (1992) provided an "incomplete" trade-off matrix for ten life-history traits, i.e. 45 life-history trade-offs. He pointed out that only five of these had received much attention and most of this from ecological or evolutionary studies. This symposium will provide a state-of-the-art look at this issue. Talks will cover a wide range of life history traits: offspring size and number, future versus current reproduction growth versus subsequent condition, and survival and reproductive maturity versus life-span and aging. The symposium will also be taxonomically broad with talks on insects, fish, reptiles, birds and mammals. Rather than simply give detailed presentations on specific experimental work each speaker will hopefully summarize the current state of our knowledge on the mechanistic basis of the major life-history and highlight important areas for future research.

Metabolic Complications in HIV/AIDS

APS Endocrinology and Metabolism Section

Kevin Yarasheski

K. Yarasheski, K. Mulligan, C. Grunfeld, P. Tebas, and W. Lewis

Recent data highlight the complexities involved in understanding and managing the constellation of alterations in fat distribution and glucose and lipid metabolism that have occurred in the current treatment era. Although there is ample evidence that protease inhibitors play a role in the development of some of these alterations, current data suggests a role for nucleoside analogue, reverse transcriptase inhibitors as well. In addition, factors such as age, body mass index, gender, race, duration of HIV infection, and effective viral suppression, may also modulate risk of developing fat distribution and metabolic abnormalities. Current prevalence estimates vary and the interrelationships among the metabolic and fat distribution abnormalities have not been defined. In addition, the etiology specific sites of dysregulation clinical sequelae and effective management strategies for these alterations remain to be identified.

Other Symposia

Regulation of Fluid and Electrolyte Balance in the GI Tract

American Federation for Medical Research

Kim Barrett and Richard H. Moseley

Calcium Regulation for Muscle Contraction

Assoc. of Latin American Physiology Societies

Carlo Caputo and Gonzalo Ferreira

G. Ferreira, A. Guerrero, C. Perez, and C. Caputo

Refresher Course: Endocrinology in Modern Medical Curricula

Richard Vari and Andrew J. Lechner

Joint APS/AAA Symposium: Is Asthma the Inflammatory Bowel Disease of the Gut?

APS Gastrointestinal Section

Helen Raybould

A Call to Activism: Communicating About Science

APS Public Affairs, AAI, AAA, ASPET

William Talman

How to Get Published in APS Journals

Dale Benos

Liaison with Industry Committee Workshop: Understanding and Interacting with Industry in Scientific Research

Glenn Reinhart

Microcirculatory Society President's Symposium: Signaling Mechanisms of Nitric Oxide Synthase

Microcirculatory Society

Walter N. Duran

Lipid Mediators of Angiogenesis

American Federation for Medical Research

Denis English

R.M. Strieter, J.R. Jackson, T.T. Hla, S. Spiegel, E.J. Goetzl, J.G.N. Garcia, and D. English

Microcirculatory Society Young Investigator Award

Microcirculatory Society

Samina Kanwar

Microcirculatory Society E.M. Landis Award Lecture

Walter N. Durán

Type 1 Diabetes - Etiology Prevention and Cure

American Federation for Medical Research

Richard W. Furlanetto

**The Role of Mediators of Innate Immunity
in the Inflammation Associated with Trauma**

American Federation for Medical Research

Ann Nicholson-Weller

A. Nicholson-Weller, C. Doerschuk, C. Gerard,
and L. Klickstein

**Physiology InFocus: Neurotransmitters in
Cardiovascular Regulation: GABA**

Alan F. Sved

**How to Write Review and Publish Manuscripts
in APS and ASPET Journals**

APS Women in Physiology Committee

Kim Barrett

New Contact Information?

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phone or fax number? Has your
email address changed? If so,
please notify the APS

Membership Office at 301-530-
7171, or fax to 301-571-8313.

Thank you for helping us keep
our records current!

Section-Sponsored Featured Topics

Poster Discussion: Muscle Fatigue

William T. Ameredes

Plasticity and Repair of the Phrenic Motor System

Following Cervical Spinal Injury: Current Concepts

Donald C. Bolser and Gordon S. Mitchell

Calcium Sensing Receptors

Gerda E. Breitwieser

EDHF: Chemical Nature and Sites of Action

William B. Campbell and Paul M. Vanhoutte

Cerebral Cortical Influences on Autonomic Regulation

David Cechetto

Cellular Mechanisms of Regulated Secretion in the GI Tract

Catherine S. Chew and John G. Forte

Robert M. Berne Award Featured Topic

William Chilian

Understanding the Role of the Angiotensin System Through the Actions of Angiotensin (1–7)

Carlos M. Ferrario and K. Bridget Brosnihan

Role of the Endothelial Factor in Hypertension

Gregory Fink and David Pollock

Featured Presenter: David Mattson

Physiology of Urea Transporters

Robert B. Gunn and Jeff M. Sands

Cell Signaling in Airway Smooth Muscle

Susan J. Gunst and Keith Jones

Cellular Response to Mechanical Stress

Rolf D. Hubmayr and Jeffrey J. Fredberg

Regulation of Vascular Tone by Oxygen:

Many Mechanisms—Few Answers

William F. Jackson

What is the Role of Mast Cells in Cardiovascular Disease

Joseph S. Janicki and Gregory L. Brower

Wiggers Award: Novel Mechanisms of Cardiovascular

Control by Nitric Oxide

Gabor Kaley

Autonomic and Cardiovascular Regulation:

Focus on Nociceptin and Opioid Peptides

Daniel R. Kapusta

Developmental Regulation of Oxygen Sensing

P. Kumar and John L. Carroll

Renal Section Young Investigator Award Featured Topic:

Hypertonicity Stress: New Sites of Recognition

H. Moo Kwon

Role of the Endothelium in GI Inflammation

Peter R. Kvietys, and J. Steven Alexander

The Emerging Neurobiology of Obesity:

Autonomic and Cardiovascular Implications

Allyn Mark

Mechanisms and Modifications of Alveolar Epithelial Fluid Transport in the Mammalian Lung

Michael A. Matthay

Comparative Aspects of Circadian Organization in Vertebrates

Michael Menaker and Carla Green

The Evolution and Modification of the Hypercapnic Ventilatory Response

William K. Milsom and Steve F. Perry

Heat Shock Proteins: Environmental and Exercise Stress

Pope L. Moseley

Electroneutral Ion Transport in the Central Nervous System

John A. Payne

Neural and Endocrine Regulation of Blood Volume and Arterial Pressure

Pontus B. Persson and Heimo Ehmke

Invited Presenter: Hartmut Kirchheim

Special Focus Topic: Perspective on Problem-Based Learning: Thorns and Roses

Patangi K. Rangachari and Aviad Haramati

Role of Oxidative Stress in Hypertension

Jane Reckelhoff and Magdalena Alonso-Galicia

Invited Presenter: Christopher Wilcox

Nitric Oxide: Skeletal Muscle Function and Blood Flow

Michael B. Reid and Michael D. Delp

Molecular Mechanisms of HCO₃⁻ Transport

Michael F. Romero and Paul M. Quinton

Ion Channel Remodeling in Cardiovascular Disease:

Pathogenesis and Therapeutic Implications

Nancy Rusch and Craig H. Gelband

Cell Stress and Protein Kinases: Integrated Signaling in vivo

Kenneth B. Storey

Mechanisms of Muscle Injury in Sepsis

Gerald Supinski

Spinal Cord Injury: Degeneration, Plasticity, Repair and Therapy

Lynne Weaver

Ion Transport in Gametes and Reproductive Epithelia

Patrick Y.D. Wong and Sylvie Breton

Somatic Sensation During Movement and Its Role in Autonomic Control

Bill Yates

Full-page ad

Experimental Biology

Physiology and Experimental Biology 2000

Experimental Biology 2000 was held April 15-18 in San Diego, California and was a joint meeting of four FASEB societies: APS, American Society for Investigative Pathology (ASIP), American Society for Nutritional Sciences (ASNS), and American Association of Anatomists (AAA). The APS hosted five of the eight participating guest societies: The American Federation for Medical Research (AFMR), Biomedical Engineering Society (BMES), North American Society for Biorheology (NASB), The Microcirculatory Society (MCS), and Society for Experimental Biology and Medicine (SEBM). EB 2000 marked the first meeting since 1993 that was not organized around themes.

A total of 4,647 volunteered abstracts was submitted for presentation, representing a 21% increase in abstract submission from the last four-society meeting held in New Orleans, 1997. Of the total abstracts submitted for EB 2000, 48% (2,550) were submitted by members of APS and its guest societies.

EB 2000 accepted late-breaking abstracts which were submitted by the deadline of February 21, 2000 and printed in the program addendum. All late-breaking abstracts were scheduled as posters on the last day of the meeting. A total of 238 late-breaking abstracts were received, of which 42% (101) were sponsored by members of APS. The practice of carpeting the poster area was continued, which greatly reduced fatigue caused by walking on hard concrete and reduced the noise level in the exhibit hall. Posters sessions for each society were scheduled in one designated area of the exhibit hall for the duration of the meeting and program directories were placed at the end of poster rows, which included the session titles with appropriate poster board numbers. Attendees could easily see which sessions were scheduled without having to refer to the program book. APS continues to explore ways to improve the signage and make the

poster area more user-friendly.

Of the 2,617 abstracts processed by APS, 22% (576) were presented by female scientists as first authors and 19% (502) were received from institutions outside of The Americas. Government laboratories represented 4% (112) of the abstracts received, and industry laboratories represented 2% (66). Table 1 provides the departmental affiliations of the abstracts processed by APS and indicates that 26% (680) were received from departments of physiology and 4% (115) from departments of physiology and biophysics.

The APS programmed a total of 295 sessions, including 175 poster, 46 featured-topic, 49 symposium, 16 lectures, four Physiology InFocus, two poster-discussion, one refresher course, one workshop, and one on-the-floor poster discussion sessions. The lecture sessions included 12 Section Distinguished Lectureships, the Walter B. Cannon, Henry Bowditch, and Walter C. Randall Lectures as well as The Microcirculatory Society's Landis Award lecture.

Among the 49 symposium sessions were two half-day sessions related to physiological genomics, one entitled "Cells and Genes and their Applications for Therapies for the Brain" chaired by Beverly L. Davidson and Howard Federoff, and the other entitled "Bioinformatics: From Sequence to Disease" organized by Peter Tonellato.

The Physiology InFocus Program, organized by Walter F. Boron, was entitled "Channels and Transporters" and included four symposia: "Structure-Function Relationships in Voltage-Gated Ion Channels," chaired by Richard Aldrich; "Aquaporins and Other Members of the MIP Family" chaired by Peter Agre and Maarten Chrispeels; "Genetic Abnormalities of Channels and Transporters," chaired by Seth Alper; and "Structural Biology of Channels," chaired by Mark Yeager.

The APS Mixer was held on Saturday evening and included sumptuous desserts, dancing, and an opportunity to meet with colleagues in a relaxed, festive atmosphere. The second annual Young Experimental Scientist Mixer, designed to enhance interaction between younger members of the participating societies, was held on Monday evening. Both socials were well-attended and will be continued at EB 2001.

The total meeting registration was 9,185 which indicates a 21% increase from the last four-society meeting held in 1997 in New Orleans. Of the 7,131 total scientific registration: 3,439 (48%) were members (including 100 retired members), 1,730 (24%) were nonmembers, and 1,962 (28%) were students. There were 1,474 exhibitors, 401 guests of exhibitors, 137 guests of scientists and, 42 press registrants.

Table 1. EB '00 Author Affiliations of Programmed Volunteered Papers

Department	Number of Papers	% Total
Physiology	680	26%
Medicine	172	7%
Biology	158	6%
Biomedical Engineering	144	5%
Physiology & Biophysics	115	4%
Cardiology Sciences	109	4%
Surgery	102	4%
Anesthesiology	55	2%
Pediatrics	52	2%
Exercise/Sports Medicine	34	1%
Pharmacology	23	1%
Biochemistry	19	1%

Experimental Biology

The American Physiological Society gratefully acknowledges financial support through educational grants, from Abbott Laboratories, AstraZeneca LP,

Burroughs Wellcome Fund, Collateral Therapeutics, DuPont Pharmaceuticals Company, The Gatorade Company, Genentech, Inc., Genzyme Corporation,

Grass Foundation, Pfizer, Inc., William Townsend Porter Foundation, Taylor University and Wyeth-Ayerst Pharmaceuticals. ❖

Chapter News

Iowa Physiological Society Holds Fifth Annual Meeting

The fifth annual meeting of the Iowa Physiological Society (IPS) was held on April 21 and 22 at the Hotel Fort Des Moines in Des Moines, Iowa in conjunction with a meeting of the Iowa Academy of Science (IAS). The meeting is held jointly with both organizations in order to provide greater opportunities for scientific discussion, collaboration and camaraderie. Additionally, because of the membership structure of these two organizations, this concurrent meeting allows for teachers and researchers at various educational levels (high school through university) to elaborate on the diversity of Iowa research (anthropology through zoology) and contemplate and coordinate like research concerns, efforts and programs (evolution through murine genetics). As expected, our organizations have prospered scientifically in this joint effort.

Twelve posters were presented at this year's meeting, ranging in topic from "VEGF Receptor Expression" to "Sympathetic Neuronal Actions of Angiotensin" and "Clinical Use of Enalaprilat in Resuscitation." Abstracts were made available on the IPS web site prior to the meeting (http://www.the-aps.org/chapters/chp_iowa/iowa.htm). Previewing sessions of all posters were held on both days of the meeting with designated attendance times of each poster author in order to stimulate discussion. With a manageable 63 attendees at the formal section program on Saturday, April 22, authors were

allowed ten minutes to present their research and the ensuing discussion was often lively and informative. Over the last few years, we find this presentation approach to be very helpful in communicating the research findings and facilitating discussion.

Through a generous Lectureship Award from the American Physiological Society, our meeting highlight was the keynote presentation by Curt Sigmund, Associate Professor from the Department of Internal Medicine and the Department of Physiology and Biophysics at the University of Iowa in Iowa City where he is also the Director of the University's Transgenic Animal Facility. Sigmund presented his state-of-the-art lecture to an audience of 74 on "Genetics and Physiology in Mice: A Perfect Marriage," in which he touched upon the basics and the complexities in the development of transgenic and knock-out animal models used in his research program's investigation of such cardiovascular problems as blood-pressure control by the renin-angiotensin system. Only a few days prior to our chapter meeting, Sigmund delivered the 2000 Bowditch Lecture at the American Physiological Society Meeting in San Diego, California.

Separate business meetings of the IPS and the Physiology Section of the IAS were held on Saturday, April 22 (the IPS President also serves as Chair of the IAS Physiology Section) prior to the

joint IPS/IAS poster session. Committee reports were heard and elections for the new IPS president-elect were chosen and the election for the treasurer position was held. The new President of the Iowa Physiological Society is **Piper Wall**, Staff Scientist, Surgical Education Department, Iowa Methodist Hospital in Des Moines, IA 50309; Email: wallp0@ihs.org. Our treasurer is **Mark Chapleau**, Internal Medicine, University of Iowa, Iowa City, IA 52242; Email: mark-chapleau@uiowa.edu. Our president-elect is Thomas J. Schmidt, Professor, Physiology and Biophysics, University of Iowa, Iowa City, IA 52242; Email: thomas-schmidt@uiowa.edu.

The sixth annual meeting of the IPS will again be held in conjunction with the 113th Annual Meeting of the Iowa Academy of Science and will take place April 20-21, 2001 at the Hotel Ft. Des Moines (<http://www.hotelfortdm.com/>) in Des Moines, IA. Our Scientific Sessions will be merged with those for the 34th Annual Meeting of the Academy's Physiology Section. There will be opportunity for both oral and poster papers. Further details will be available in late 2000 and early 2001 on our chapter web site http://www.the-aps.org/chapters/chp_iowa/iowa.htm ❖

*Luke H. Mortensen, Past President
Iowa Physiological Society
Luke.Mortensen@dmu.edu*

Chapter News

Nebraska Physiological Society Holds Third Annual Meeting

The third annual meeting of the Nebraska Physiological Society was held on Friday, August 11, 2000 at the Storz Pavilion, Bishop Clarkson Hospital in Omaha, Nebraska. Twenty-seven posters were presented. The interaction was vigorous and information exchange remained unabated. The meeting started at 8:30 AM following a 30-minute breakfast period with a welcome address by Irving H. Zucker, President of the Society and a brief overview of the mission of the Society. He emphasized the importance of being a part of the educational system in local colleges to attract more students and also to include more physiology teaching related materials. Another theme was to include other physiological sciences in the agenda as focus areas. This overview was followed by the introduction of the keynote speaker, Richard Traystman, Distinguished Professor and Senior Vice Chairman, Department of Anesthesiology, Johns Hopkins University School of Medicine, and a former Council member of the American Physiological Society. Traystman's visit was sponsored by the American Physiological Society. The title of Traystman's talk was "Cerebral Ischemia: Mechanism of Injury and Neuroprotection." Traystman praised the formation of the Nebraska Physiological Society and encouraged people to participate to make a strong local chapter. His talk highlighted the role of endocrine factors and stem cells, among other things, in neuroprotection. He summarized the effect of anesthetics in neuroprotection and concluded that anesthetics may not be major players. He discussed the potential role of superoxides, phospholipases, neural growth factors, such as basic fibroblast growth factor and anti-neutrophil factor. He highlighted the latest advances in gene manipulations to address neuroprotection by using knockout and transgenic mice. He also indicated the potential

role of stem cells in neuroprotection.

One of the major highlights of this year's meeting was two local talks on computerized physiology teaching, which started after a 30-minute coffee break. Michael D. Mann, Professor, Department of Physiology and Biophysics, discussed the advantages and limitations of web-based teaching and helped the audience understand how to set up web-based teaching programs. Harold D. Schultz, Professor, Department of Physiology and Biophysics, demonstrated a computer-based physiology laboratory exercise for medical students. He highlighted areas where human volunteers could be used and where animal usage would still be preferable. Both of these talks went extremely well and the audience had a good understanding of the processes involved in this type of pedagogical endeavor. The discussion was outstanding. Several faculty felt that these talks should be presented at other groups associated with APS such as the Association of Chairs of Departments of Physiology meeting. Because the meeting is attended by physiologists from small and medium size colleges and universities, the education talks provided many with the opportunity to include such approaches in their teaching.



Irving Zucker and Richard Traystman at the Nebraska Physiological Society meeting.

The poster session followed the local talks and represented investigators from the Departments of Physiology and Biophysics, Pharmacology, OB/GYN and Ophthalmology at the University of Nebraska Medical Center, Department of Biomedical Sciences at Creighton University School of Medicine, and the University of Nebraska at Kearney. Physiological topics included ion channels, growth factors, hormone receptors, kinases, nitric oxide synthase, cloning of genes involving heart, general and microcirculations, brain, kidney and gonads, and educational posters. The interaction between people working in different areas of the physiological sciences was excellent, and many graduate and postdoctoral students got the opportunity to interact with each other as well as with other investigators. There were three exhibition booths set up by North Central Instruments to demonstrate various microscopes and other instruments, by AD Instruments demonstrating Powerlab for teaching and laboratory research, and by Fisher Scientific highlighting various new products that are now being sold through Fisher with significant discounts to the universities. The exhibits were helpful additions to the meeting and gave participants a chance to interact with the company representatives. We were very grateful to these three sponsors for this year's meeting. Their financial help allowed us to defray some of the cost involved in arranging the annual meeting. We are also grateful to the Department of Physiology and Biophysics, UNMC for sponsoring this year's meeting, and to Nebraska Health System, Bishop Clarkson Hospital for allowing us to use the Storz pavilion free of charge which contributed to a very successful meeting.

Following the poster session, lunch and the NPS business meeting were held simultaneously to end the meeting in time. Zucker opened the business

Chapter News

meeting. Traystman talked about the present status of the American Physiological Society and its goals. He emphasized the need for physiologists to support the APS by being active members, i.e., taking active roles in various decision making and providing new ideas, and publishing their best papers in the society's journals. He mentioned that the impact factor for various APS journals would be improved by separating each section of the *American Journal of Physiology* from the combined journal. ISI has now agreed to do this. APS is improving its scientific programs by including more plenary lectures and mini-symposia on state-of the art research. Traystman mentioned various opportunities in the APS and encouraged people to avail themselves of some of the benefits that the Society offers. He also mentioned that APS has launched a new journal entitled *Physiological Genomics* and made members aware of the fact that molecular approaches will play a major role in future research in physiology. The new strategic plan for APS will be published in *The Physiologist*. The next order of business was the election of officers for NPS. Pamela Carmines, Professor, Department of Physiology and Biophysics, UNMC replaced Irving Zucker as the president for the next year. Nominations were sought for the president-elect and council members. David Petzel, Professor, Creighton University School of Medicine, was nominated as the President-elect and unanimously elected. Nominations for the council member were sought and

Dale Bergren, Associate Professor, Creighton University School of Medicine was elected as the council member replacing Carmines, who became president. The election was followed by the treasurer's report. Shyamal K. Roy, Secretary and Treasurer presented the current financial status of the NPS. The financial situation of the NPS has improved significantly since the last year with three sponsors for this year's meeting. This was the first year that NPS budget started with a surplus and ended with an additional surplus. Roy emphasized that more needs to be done to further improve the budgetary condition and some ideas were to attract more companies, such as publishers of physiology textbooks and biotech companies. On behalf of the NPS, Roy thanked all three sponsors for providing financial help and the Department of Physiology for supporting the abstract booklet. There was no more discussion and the treasurer's report was unanimously accepted by the members. There was no discussion about a future meeting place. In the next order of business, Zucker elaborated on the future goals of the NPS. He suggested formulating a list of speakers who can give talks in local schools and colleges on various topics of physiology to attract students into physiology careers. He also proposed for members to get involved in career days, give scientific talks and judge science fair projects in various elementary and high school. This approach is to motivate young minds to choose a career in physiology as well as to edu-

cate them about various activities of the NPS members. Other proposals were to be involved with graduate recruiting at state colleges, arrange joint meetings with other local societies to make NPS more visible. One of the major suggestions was to recognize the best posters at the meeting and provide awards towards attending a major meeting. This category would include graduate students, postdoctoral fellows, and young investigators. A proposal was made to set up awards for teachers in undergraduate colleges who are involved in physiology research; the idea was to entice them to become a member of the NPS. Further, development of a liaison between the American Physiological Society and university administration, such as the Dean and Chancellor, was also proposed. There was some discussion but members were encouraged to pass their opinions to the new president and to develop a forum.

In the final phase of the meeting, Traystman talked about the current status of animal research in the US and alerted members about various activities of the opposition groups. He elaborated on the seriousness of their approach and requested members not to give any opportunity to those groups for any adverse impact. There were some discussion. Following Traystman's talk there was no more business and the meeting was adjourned at 3:32 PM.

*Shyamal K. Roy, PhD
Secretary-Treasurer of the NPS*

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Women Make Significant Gains in Science and Engineering Fields; Minorities Show Limited Progress

Women are more likely than men to graduate from high school, to enroll in college, and to graduate from college. In addition, they are making inroads into men's dominance of science and engineering careers, according to the latest compendium of education, employment, and demographic data, *Professional Women and Minorities*, published by the Washington, DC-based Commission on Professionals in Science and Technology. In 1997, women comprised 56% of undergraduate enrollment and earned nearly 56% of the 1,186,589 baccalaureates awarded.

The 13th edition of this compendium compiles in tables and charts data that trace the gains made by women and members of minority groups and shows the shortfalls of these groups, particularly in science and engineering (S&E) fields, as they move toward parity in these fields. Specifically the report finds:

In the S&E fields, women have nearly doubled their proportion of earned baccalaureates over the last 30 years. In 1967, they earned slightly over 25% of S&E baccalaureates; by 1997, they earned 48%. In the natural sciences, which includes the physical, math, computer, environmental and life sciences, women's proportion of earned baccalaureates was less—37% in 1997—but up from 17% 30 years earlier.

At the master's level, women have been slowly increasing their proportional advantage over their male counterparts: from 1982, when they first became a majority by earning 50.3% of all master's degrees granted, to 1997 when they earned nearly 57%. However, in the S&E fields, women are still a minority at the master's level, earning 41.5%.

At the PhD level, while women earned nearly 42% of the doctorates awarded in 1998, their proportion of

S&E doctorates was only 34.3%, and when the social and behavioral sciences are excluded, their proportion drops even more.

The gains by the underrepresented minority groups (African Americans, Hispanics, and Native Americans) have not been as substantial as those evidenced by women. At the baccalaureate level, African Americans saw their proportion of S&E degrees grow slightly from 5.5% in 1990 to 7.7% in 1997, while Hispanics increased their proportion from 4.2% to 6.4% and Native Americans from 0.4% to 0.6% in the same time period. Asian Americans increased their proportion from 3.7% to 5.9% during the 1990-1997 time frame.

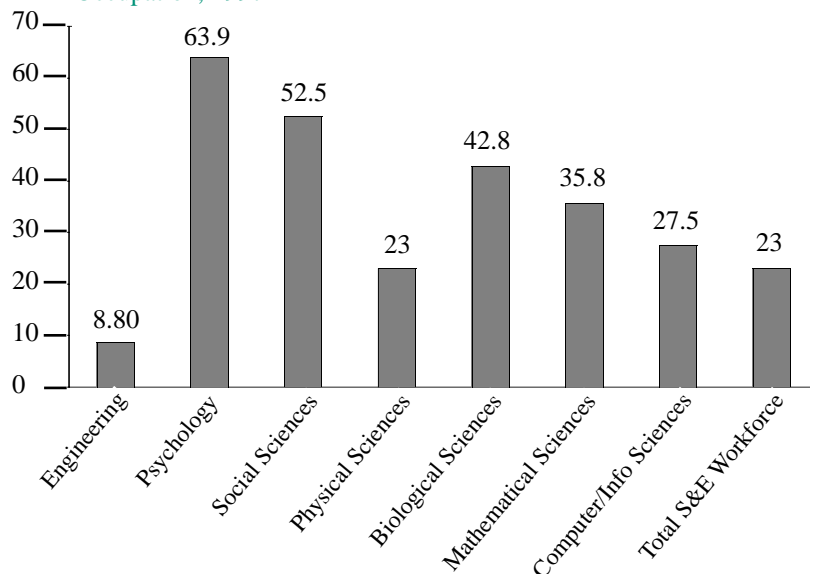
These small gains made by underrepresented minorities at the baccalaureate level translate into even smaller gains at the graduate levels. By 1997, of the science and engineering master's degrees awarded, African Americans earned 5.7%, Hispanics earned 4.3%, and Native Americans, 0.5%. In absolute numbers, these percentages translate into 2,200 S&E master's degrees earned by African Americans, 1,306 by

Hispanics and 155 by Native Americans. The figures are more dismal at the doctoral level. In 1998, of the 18,125 S&E doctorates awarded to US citizens and permanent residents, African Americans earned 3.5% (639) of the S&E doctorates, Hispanics earned 4.1% (752), and Native Americans 0.5% (96). In contrast, Asian Americans earned 11.8% (2,140).

Women also have made great inroads toward preparing for careers in medically related fields and law. In just 20 years, from 1977 to 1997, women entered these areas in such numbers that they now receive a majority of the degrees awarded in optometry, veterinary medicine and pharmacy. They are approaching parity in medicine, earning 41.7% of the degrees awarded in 1997 and in law, earning 43.7%.

Not surprisingly, women and minorities comprise a smaller proportion of the S&E workforce than they do of S&E degree recipients. In 1997, women earned 48% of the bachelor's degrees in science and engineering, 43% of the master's degrees and 34% of the PhDs. However, they made up only 23% of the

Table 1. Women as a Proportion of the S&E Labor Force by Occupation, 1997



Career Report

S&E labor force in 1997, and that proportion varied widely by occupation as shown in the accompanying chart.

Despite some progress by minorities in preparing for careers in science and engineering, whites continue to be the major group of the S&E labor force,

comprising 83.5% in 1997.

The 13th edition of *Professional Women and Minorities: A Total Human Resources Data Compendium* is available for \$125 (nonmember) or \$100 (member) prepaid from the CPST, 1200 New York Avenue, NW, Suite 390,

Washington, DC 20005. These data tables, along with salary data, and CPST Comments excerpts soon will be available online to CPST members and affiliates through the Commission's new S&E human resources database at <http://www.cpst.org>. ❖

Deadlines! Deadlines!

The APS sponsored awards are plentiful, but in order to be considered, don't forget to submit the application information before the deadline!

Award

Next Deadline

Research Career Enhancement Awards	October 15
Teaching Career Enhancement Awards	October 15
Shih-Chun Wang Young Investigator Award	November 1
Arthur C. Guyton Awards in Integrative Physiology	November 1
Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine	November 1
Lazaro J. Mandel Young Investigator Award	November 1
Procter & Gamble Professional Opportunity Awards	November 6
Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Awards	November 6
Liaison With Industry Award for Novel Disease Models	November 6
NIDDK Travel Fellowships for Minority Physiologists for EB Meeting	November 13
John F. Perkins, Jr., Memorial Fellowships	November 15
Orr E. Reynolds History Award	December 1
William T. Porter Fellowship Awards	January 15
APS Postdoctoral Fellowship in Physiological Genomics	January 15
AAAS Mass Media Science and Engineering Fellowship	January 15
John F. Perkins, Jr., Memorial Fellowships	May 15
William T. Porter Fellowship Award	July 15

APS Awards

The following APS Awards are available to the membership. For more information and applications, please see the APS web site (<http://www.the-aps.org/awards.htm>.)

Ray G. Dags Award

This annual award is presented to a physiologist who is judged to have provided distinguished service to the science of physiology and APS. Selection is made by Dags Award Committee.

The recipient receives an honorarium of \$500, a plaque, and expenses to participate in the EB meeting. The Award is presented at the Society Business Meeting.

Orr E. Reynolds History Award

Deadline: December 1

The Orr E. Reynolds History Award is given annually by APS for the best historical article submitted by a member of the Society.

Articles may deal with any aspect of the history of physiology, including the development of physiological ideas and their application, instrumentation, individual and collective biography, departmental and institutional history, history of societies including APS, and physiology in its public context. Manuscripts should represent original research and be adequately documented. Articles published in APS journals or books during the prior calendar year are also eligible for the award upon request by the author(s). The award is open to all APS members except those holding advanced degrees in the history of science and medicine. A member may receive the award only once.

The awardee will receive \$500 plus expenses to attend the annual spring EB meeting. If the awardee wishes, and there is a suitable place on the program, an oral presentation will be made at the EB meeting or a subsequent conference at the beginning or an appropriate scientific session. It is hoped that, after appropriate peer review, the article will be published in one of the APS journals.

Manuscripts will be evaluated by a Society Awards committee consisting of three members of APS appointed annually by Council in consultation with the chair of the History of Physiology Group. At least one member will be a professional historian.

Manuscripts should conform to the style used in APS journals. Manuscripts should be sent to the Orr E. Reynolds Award, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991, by December 1. The award will be presented at the Society Business Meeting.

G. Edgar Folk, Jr., Senior Physiologist Award

The G. Edgar Folk, Jr., Senior Physiologist Fund has been set up through the generosity of family and former graduate students and postdoctoral fellows to provide assistance to senior physiologists, 70 years or older, who no longer have grant funds available to them. The awards, in the amount of \$500, might be used for such purposes as attending an APS meeting to present a paper, engaging in a series of modest experiments, or completing a manuscript. Recipients will be selected with the assistance of the Senior Physiologists Committee. Names of awardees will not be made public. When the award was established, it was for the Senior Physiologists Committee "to have fun assisting colleagues and for Emeritus APS members to keep in closer touch with APS."

Research Career Enhancement Awards

Deadlines: April 15 and October 15

The APS Career Enhancement Awards are designed to enhance the career potential of APS members. The awards provide up to \$4,000 for individuals in the early phases of their careers to obtain special training and in the later phases of their careers to develop new skills and to retrain in areas of developing interests.

The awards can be used to support short-term visits to other laboratories to acquire new skills and to support attendance at courses devoted primarily to methodologies appropriate for both new investigators and more senior investigators entering a new field of research.

Members in good standing interested in applying should submit an application including a curriculum vitae, justification for an award, description of enhancement activity and current research program, and anticipated budget for the proposed program of enhancement. The applicant must also include a letter of support either from his/her department chair, laboratory host, or other appropriate individual.

Teaching Career Enhancement Awards

Deadlines: April 15 and October 15

The Teaching Career Enhancement Awards are designed to enhance the career potential of regular members. The awards provide up to \$4,000 to develop innovative and potentially widely applicable programs for teaching and learning physiology.

The awards can be used to support short-term visits to other schools to consult with experts who can assist with the project or attendance to courses on methodologies appropriate for the educational development project.

Regular members in good standing may submit an application form including: 1) a 2-page description of the proposed project, including the aim, the educational problem that the project is designed to ameliorate, identification of the innovative aspects, a plan to evaluate the educational outcomes, and the kinds and sources of expertise needed by the to carry out the project; 2) an anticipated budget with justification for fund requests; 3) a letter of support from the applicant's department chair or other appropriate individual; 4) letters of agreement from individual or departmental hosts of schools to be visited; 5) description or outline of courses to be

APS Awards

attended; and 6) a brief curriculum vitae focused on activities and achievements related to education.

Successful applicants are expected to report, in print or at a physiology conference, a description of the project and its evaluation. Awardees are encouraged to submit reports for publication in *Advances in Physiology Education*.

Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine

Deadline: November 1

The Giles F. Filley Memorial Fund was established to recognize excellence in respiratory physiology and medicine. The awards are made to investigators holding an academic rank no higher than assistant professor and are pursuing research in respiratory physiology and medicine. Each award is for approximately \$25,000 and is designated for awardee's use in his/her research program. Awards do not include any indirect cost reimbursement.

Awards will be made annually to individuals demonstrating outstanding promise based on his/her research program in respiratory physiology and medicine. Applications will be accepted from members of APS working within the US, reflecting Giles F. Filley's contributions to the national research community through his membership in APS. Because of Filley's long association with the University of Colorado, Denver, preference for one award, on a competitive basis, will be given to individuals affiliated with that institution.

The awards will be announced during the APS Business Meeting held at the EB meeting and at the Respiration Section dinner. The recipients receive reimbursement for their expenses to attend the meeting and a plaque recognizing their designation at Giles F. Filley Awardees. The awardees are selected by a committee composed of members of the APS Respiration Section.

Arthur C. Guyton Awards for Excellence in Integrative Physiology

Deadline: November 1

The Arthur C. Guyton Fund was established in to recognize Guyton's contributions and interests in feedback, modeling, and integrative physiology. The awards are made to independent investigators, who hold an academic rank no higher than assistant professor, and are pursuing research that utilizes integrative approaches to the study of physiological function and explores the role of feedback regulation in physiological function.

An unrestricted \$15,000 award is designated for the use of the awardees in their research programs. Awards do not include any indirect cost reimbursement. Applications are accepted from regular members of APS.

The awards will be announced during the APS Business Meeting held at the Experimental Biology meeting. The recipients receive reimbursement for their expenses to attend the meeting and a certificates recognizing their designation as Arthur C. Guyton Awardees.

Shih-Chun Wang Young Investigator Award

Deadline: November 1

The Shih-Chun Wang Memorial Fund was established in 1998 in memory of Shih-Chun Wang, the Pfeiffer Professor of Pharmacology at Columbia University and a long-standing member of The American Physiological Society. Wang was internationally recognized for his research contributions in the areas of neurophysiology and neuropharmacology with an emphasis on brain stem control mechanisms. The Award will be made annually to an individual demonstrating outstanding promise based on his/her research program in the physiological sciences. Applications will be accepted from APS members working within the United States and holding an academic rank no

higher than assistant professor. The award is \$12,000 and is for the use of the awardee in his/her research program. The award does not include any indirect cost reimbursement.

Lazaro J. Mandel Young Investigator Award

Deadline: November 1

The Lazaro J. Mandel Young Investigator Award was established in 1999 in memory of Lazaro J. Mandel, professor of physiology at Duke University and long-standing APS member. The Mandel Young Investigator Award will be made annually to an individual demonstrating outstanding promise based on his/her research program in epithelial or renal physiology. Applications will be accepted from members of APS working within the United States and holding an academic rank no higher than assistant professor. The award is for \$12,000 and is designated for the use of the awardee in his/her research program. The award does not include any indirect cost reimbursement. The first Mandel Award will be presented at the EB 2000 meeting.

John F. Perkins, Jr., Memorial Fellowships

Deadlines: May 15 and November 15

APS invites applications for the John F. Perkins, Jr., Memorial Fellowships. The Perkins Fellowships are designed primarily to provide supplementary support to foreign physiologists who have already arranged for fellowships or sabbatical leave to carry on scientific work in the United States.

The supplementary support is intended to help foreign scientists bring their families to the United States and thus enable them to take fullest advantage of other cultural benefits inherent in international exchange. Preference will be given to physiologists working in the fields of respiratory physiology, neurophysiology, and temperature regulation. Applications from scientists in

APS Awards

developing countries will also be given special attention.

Application should be made by both the visiting scientist and his/her host. To qualify, the host must be a member of the APS. The application should contain an account of these arrangements with a brief description of the proposed scientific work and an account of how visitors and their families intend to make use of cultural opportunities during their stay. Deadlines for receipt of applications are May 1 and November 1. Applications are available from the Executive Director, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991, USA.

APS Postdoctoral Fellowship in Physiological Genomics

Deadline: January 15

The APS, initially in collaboration with Genentech, Inc., designed a postdoctoral fellowship program to promote careers in mammalian organ system physiology. In 1993, the APS-Genentech Postdoctoral Fellowship was established in recognition of the fact that many advances in cell and molecular will ultimately require an understanding in the context of the organism, and special training will be needed to conduct this type of research. A central criterion is that the postdoctoral project uses the tools of cellular and molecular biology in the setting of the whole animal. In 1996, APS made the commitment to continue supporting the Fellowship without the support of Genentech.

Candidates must identify a laboratory and sponsor under whose supervision a project in mammalian organ system physiology and molecular biology can be combined. The award is for a two-year period and includes an annual stipend (\$30,000) and a trainee allowance of \$3,500.

Two awards are made per year.

William T. Porter Fellowship Awards

Deadlines: January 15 and July 15

This award is designed to support the

training of talented students entering a career in physiology and to provide predoctoral fellowships for minority students, postdoctoral fellowships, and limited sabbatical leave aid for faculty members of predominantly black schools who wish to update their expertise in physiology. In addition, funds have been made available to lectureships and laboratory equipment to develop teaching consortia linking predominantly black colleges with medical schools in the same area. Summer research fellowships are also awarded for minority undergraduate opportunities for physiological research.

The recipients receive stipends, and an allowance is given to the training department or laboratory where the recipient will work.

Minority Travel Fellowship Awards

Deadline: November 13

NIDDK Travel Fellowships for Minority Physiologists are open to under-represented minorities who are advanced undergraduate, predoctoral, and postdoctoral scientists, including students, who have obtained their undergraduate education in Minority Biomedical Research Programs and MARC-eligible institutions, as well as students in the APS Porter Development Program. Applications may also be submitted by minority faculty members at the above institutions. Funds will provide transportation, meals, and lodging to attend the annual spring Experimental Biology meeting. The specific intent of this award is to increase participation of the pre- and postdoctoral minority students in physiological sciences. Applicants need not be members of the APS but should be US citizens or hold permanent resident visas. With the application form, candidates should include 1) a brief curriculum vitae; 2) a letter of recommendation from the applicant's advisor; and 3) an estimate of required travel and per diem expenses. Faculty applicants

should also include a statement of current and pending support.

Caroline tum Suden/ Frances A. Hellebrandt Professional Opportunity Awards

Deadline: November 6

The APS Caroline tum Suden Professional Opportunity Awards (\$500, complimentary registration, and placement service fees) are granted to as many as 30 graduate students or postdoctoral fellows who present a contributed paper at the EB meeting. Candidates must be the first author of an abstract submitted to APS. An accompanying letter, signed by the sponsor of the abstract, must contain 1) certification that the author is a student or postdoctoral fellow and 2) the approximate date the nominee will be available for employment. Applicants must also submit a one-page letter stating his/her research goals, role in their research, and reasons why he/she is deserving of the award. Awardees are notified by the Womens Committee prior to March 1 and presented with their awards during the APS Business Meeting.

Novel Disease Model Award

Deadline: November 6

Novel Disease Model Award (\$500/graduate student, \$800/postdoctoral fellow) will be granted to the graduate student and postdoctoral fellow submitting the best abstracts describing a novel disease model. The model can be cellular or in vivo but should clearly emphasize the potential utility of the system for future research related to a disease process. This award is sponsored by the Liaison with Industry Committee. A copy of the submitted abstract, accompanied by the signed and completed Award Certification Form should be sent to: Linda Allen, Membership Services, American Physiological Society, 9650 Rockville Pike, Bethesda, Maryland 20814-3991

APS Awards

to arrive on or before November 8, 2000.

Awards are announced during the APS Business Meeting held at the Experimental Biology meeting.

AAAS Mass Media Science and Engineering Fellowship

Deadline: January 15

APS will sponsor an AAAS Mass

Media Science and Engineering fellow who will spend 10 weeks over the summer working for a newspaper, magazine, radio or television newsroom. The program includes a one-week orientation in Washington, DC to help fellows develop their ability to communicate complex scientific issues to nonscientists. Applicants must be currently enrolled as a graduate or postgraduate

student of physiology or a related discipline.

The fellowship will include expenses for traveling to sessions and the job site as well as a weekly stipend based on the local cost of living. ❖

Section Awards

Distinguished Lectureship Awards

The 12 Distinguished Lectureship Awards are named after outstanding contributors to the disciplinary areas of physiology. The recipient is chosen by the section as a representative of the best within the discipline. The annual lecture is presented at the EB meeting. Each recipient receives an honorarium of \$1,000 and up to \$2,000 to cover travel expenses.

The 12 named Lectureships are:

- Robert M. Berne Distinguished Lectureship of the Cardiovascular Section
- Hugh Davson Distinguished Lectureship of the Cell and Molecular Physiology Section
- Joseph Erlanger Distinguished Lectureship of the Central Nervous System Section
- August Krogh Distinguished Lectureship of the Comparative Physiology Section
- Solomon A. Berson Distinguished Lectureship of the Endocrinology and Metabolism Section
- Edward F. Adolph Distinguished Lectureship of the Environmental and Exercise Physiology Section
- Horace W. Davenport Distinguished Lectureship of the Gastrointestinal Section

- Carl Ludwig Distinguished Lectureship of the Neural Control and Autonomic Regulation Section
- Carl W. Gottschalk Distinguished Lectureship of the Renal Section
- Julius H. Comroe, Jr., Distinguished Lectureship of the Respiration Section
- Claude Bernard Distinguished Lectureship of the Teaching of Physiology Section
- Ernest H. Starling Distinguished Lectureship of the Water and Electrolyte Homeostasis Section.

Procter & Gamble Professional Opportunity Awards

Deadline: November 6

The Procter & Gamble Professional Opportunity Awards (providing \$500 and complimentary registration for the EB meeting) are granted to at least 17 predoctoral students who present a contributed paper at the meeting. Candidates must be the first author of an abstract submitted to APS and within 12-18 months of completing his/her PhD degree. All recipients must be US citizens or hold a permanent resident visa. An accompanying form, signed by the sponsor of the abstract, must contain 1) certification that the author is a predoctoral student and 2) the approximate date of degree completion.

Awardees are selected by the following sections of APS: Cardiovascular, Cell & Molecular Physiology, Central Nervous System, Comparative Physiology, Endocrinology & Metabolism, Environmental & Exercise Physiology, Gastrointestinal, Neural Control & Autonomic Regulation, Renal, Respiration, Teaching of Physiology, and Water & Electrolyte Homeostasis.

Cardiovascular

Deadline: November 30

The Young Investigator Award is intended for members, but not necessarily fellows, of the Cardiovascular Section of the American Physiological Society who have received a PhD or MD degree with an academic rank or equivalent not higher than that of Assistant Professor who have already made a substantive independent contribution and hold future promise but are not, as yet, well established. The nomination package, to be sent to the Chair of the Awards Committee of the APS CV Section, should consist of a letter of nomination, a seconding letter (preferably from someone outside the nominee's institution), and a CV of the candidate.

The Berne Distinguished Lectureship Award is presented to a scientist who is

Section Awards

a Fellow of the Cardiovascular Section of the American Physiological Society, who has made outstanding prior contributions to cardiovascular research, and whose current research is particularly interesting, such that the presentation of this work would be expected to further interest in the CV Section meeting. This award is in honor of one of the most distinguished members of the Cardiovascular Section, Robert M. Berne. The nomination package, to be sent to the Chair of the Awards Committee of the APS CV Section, should consist of a letter of nomination, one or more seconding letters (preferably from someone outside of the nominee's institution), and a CV of the candidate.

The Wiggers Award is presented to a scientist who is a Fellow of the Cardiovascular Section of the American Physiological Society, who has made outstanding and lasting contributions throughout their career to cardiovascular research, and who will bring broader and more international representation to the CV Section meetings. This award is in honor of the Cardiovascular Section's founder, Carl J. Wiggers. The nomination package, to be sent to the Chair of the Award Committee of the APS CV Section, should consist of a letter of nomination, one or more seconding letters (preferably from someone outside of the nominee's institution), and a CV of the candidate.

The Young Investigator Travel Award is designed to entice submission of abstracts to the Experimental Biology meetings from junior investigators and to aid them in their travel expenses. To be eligible, the investigator must be within ten years of receiving his/her PhD or MD degree and have submitted a first-authored abstract to a Cardiovascular Section topic category. Abstracts from eligible individuals will be judged by the Cardiovascular Section Awards Committee and a total of up to nine each year that are judged to be the most meritorious will be

awarded. Eligible individuals are requested to email a copy of their submitted abstract to the Chair of the Awards Committee of the APS CV Section to arrive by **November 30**.

Cell and Molecular Physiology

Deadline: February 21, 2001

The Cell and Molecular Physiology Student Awards (\$300) are available for up to two pre-doctoral candidates, depending on applicant pool. One award will be given for work done while enrolled as a medical or graduate (doctoral or masters) student. A second award is reserved for undergraduate researchers. Applicants must be first author on an abstract submitted to the Experimental Biology meeting. The student or their mentor must be a member in good standing of the APS, with a primary affiliation in the Cell and Molecular Physiology section. Members of the CAMP Steering Committee will review all applications. Winners will be announced, and awards presented, at the Cell and Molecular Physiology Section Banquet at the EB meeting. Applicants must complete the Student Award Certificate form and have the mentor submit a brief (e.g. half page) letter describing why the trainee is deserving of the award. Fax a copy of the submitted abstract, the Student Award Certification form, and letter to Dr. Marshall Montrose: 317-278-3840.

The Cell and Molecular Physiology Young Investigator Awards (\$500) will be given to two successful candidates for work performed while in the first through third postdoctoral year or medical residency. Applicants must be first author on an abstract submitted to the Experimental Biology meeting. The trainee or their mentor must be a member in good standing of the APS, with a primary affiliation in the Cell and Molecular Physiology section. Members of the CAMP Steering Committee will review all applications. Winners will be announced, and awards presented, at the Cell and Molecular

Physiology Section Banquet at the EB meeting. Applicants must complete the Student Award Certificate form and have the mentor submit a brief (e.g. half page) letter describing why the trainee is deserving of the award. Fax a copy of the submitted abstract, the Student Award Certification form, and letter to Dr. Marshall Montrose: 317-278-3840.

Central Nervous System

The **Central Nervous System (CNS) Section** of the APS will provide at least two awards (\$500 each) for recognition of meritorious research by young investigators who participate in the annual Experimental Biology Meeting. To qualify for this award, the applicant must have received a PhD or other professional degree within the past 10 years and must present a poster or talk at the EB meeting. The subject matter of this presentation can be any topic related to the central or peripheral nervous system. Applications will be reviewed and rated by the CNS Section Awards Committee. To apply for this award, please submit four copies of the submitted abstract (or a paragraph describing your research if it is to be presented in a symposium) and a note indicating the year you received your degree, your current position, and whether you are a member of the APS. Membership in the APS is not required but is highly recommended. Mail these items by January 31, 2001 to the Chair of the CNS Section Steering Committee: Susan Barman, Department of Pharmacology & Toxicology, Michigan State University, East Lansing, MI 48824-1317.

The Van Harreveld Memorial Award (\$250) will be presented by the CNS Section to recognize outstanding research in neuroscience by a graduate student or postdoctoral fellow. The recipient must be first author on an abstract presented at the meeting. Mail copy of the submitted abstract and the completed APS Award Certification Form to Linda Allen, Membership

Section Awards

Services, APS, 9650 Rockville Pike, Bethesda, MD 20814-3991. Deadline for application is **November 6, 2000**.

Comparative Physiology

The **Comparative Physiology Section Scholander Award** (provides \$200 and a certificate) will be presented to an outstanding young investigator presenting a paper in the "Scholander Award" session. Applicants must submit their abstract to the "Scholander Award Session" topic category, be first author on the abstract and not more than five years past the highest degree. Mail a copy of your abstract submission and the completed *APS Award Certification Form* to Linda Allen, Membership Services, APS, 9650 Rockville Pike, Bethesda, MD 20814-3991. **Deadline for applications is November 6, 2000.**

The **Young Investigator Award** (\$500) will provide three travel awards for recognition of meritorious research by young investigators who participate in the annual Experimental Biology meeting. Candidates must have completed their PhD within the past ten years, be a member of APS, and must present a talk or poster at the EB meeting. The subject matter can be any topic that deals with comparative physiology. Applicants should submit their abstract, a one-page CV, and a one-page summary of research accomplishments and goals via email to David H. Evans, Chair of the Comparative Section (devans@zoo.ufl.edu) by January 15, 2001 for review by the section Steering Committee. The winners will be notified by email by February 15, 2001, and the award will be presented at the Business Meeting of the Section during the EB meeting.

Endocrinology and Metabolism

Research Award of the Endocrinology and Metabolism Section (certificate plus cash prize, depending on funds available) is intended to recognize graduate student, resident or post-

doctoral fellow who presents the best abstract for research in the area of endocrinology and metabolism at the Experimental Biology Meeting. Applicants must be first author on a submitted abstract and should mail a copy of the abstract, the completed Award Certification Form, and a letter from the sponsor of the abstract indicating the training status of the individual to: Linda Allen, Membership Services, A.P.S. 9650 Rockville Pike, Bethesda, MD 20814-3991. Abstracts will be judged for scientific content by a committee comprised of the E&M Section members. The successful candidate will be notified approximately 30 days prior to the Experimental Biology Meeting and will be presented the award during the Endocrinology & Metabolism Section Business Meeting. Deadline for application is **November 6, 2000**.

The Endocrinology & Metabolism Section Young Investigator Award (\$500) is presented to one or more pre-doctoral graduate students whose investigation in endocrinology and metabolism physiology has been designated by the Steering Committee as being an example of meritorious research. The recipient must be first author on a submitted abstract to the Endocrinology & Metabolism Section (see Physiology topic category list under the heading "Endocrinology & Metabolism Section"), and be certified by his/her advisor as being eligible for such an award. A copy of your abstract submission and a completed APS Award Certification Form should be mailed to: Linda Allen, Membership Services, 9650 Rockville Pike, Bethesda, MD 20814-3991. Deadline for application is **November 6, 2000**.

Environmental and Exercise Physiology

The Environmental and Exercise Physiology Section (EEP) presents the following awards at its Business Meeting or Awards Banquet during the Experimental Biology Convention.

The EEP Honor Award is presented to a current or retired primary member of the Section whose research has made significant contributions to the advancement of environmental, exercise, or thermal physiology. Recognition includes members whose teaching, mentoring, and service endeavors have enhanced the functions of the Section while promoting the Society's objectives. The recipient will receive a plaque, a check for \$1000, reimbursement of their registration fee, and the opportunity to be the featured speaker at the Awards Banquet of the Section.

The **Gatorade Beginning Investigator Award** is presented to a post-doctoral fellow or its equivalent whose investigation in either environmental, exercise, or thermal physiology has been designated by the Steering Committee as an outstanding example of experimental research. The recipient must be first author on a submitted abstract to the EEP Section, answer a questionnaire from the Steering Committee, have received their advanced degree within four years of the date of the abstract deadline, and be present at the Awards Banquet. The awardee will receive a certificate, a check for \$650, and reimbursement of the registration fee.

The **Gatorade Young Investigator Award** is presented to a pre-doctoral graduate student whose investigation in either environmental, exercise, or thermal physiology has been designated by the Steering Committee as an outstanding example of experimental research. The recipient must be first author on a submitted abstract to the EEP Section, certified by his/her advisor as being eligible for such an award, answer a questionnaire from the Steering Committee, one who has not received an advanced degree at the date of the abstract deadline, and be present at the Awards Banquet. The awardee will receive a certificate, a check for \$500, and reimbursement of the registration fee.

The **EEP Recognition Award** is pre-

Section Awards

sented to one or more pre-doctoral graduate students whose investigations in either environmental, exercise, or thermal physiology has been designated by the Steering Committee as being an example of meritorious experimental research. The recipient must be first author on a submitted abstract to the EEP Section, and be certified by his/her advisor as being eligible for such an award. The awardee will receive a certificate and a check for \$500.

Gastrointestinal

The **Gastrointestinal Physiology Section Student Prize** (\$500) is designed to challenge and reward trainees who are engaged in gastrointestinal research. Two awards will be made at the Experimental Biology Meeting. One will be given for work done while enrolled as a doctoral or medical student. A second award will be given for work performed during the first through third postdoctoral years or during a medical residency. In order to be considered, the applicant must be first author on an abstract submitted for the meeting and either the applicant or sponsor must be a member of APS. A copy of the abstract, accompanied by the signed and completed *APS Award Certification Form* should be sent to: Linda Allen, APS, 9650 Rockville Pike, Bethesda, MD 20814-3991 to arrive on or before **January 15, 2001**.

The **Abbott Distinguished Research Award for Excellence in Gastrointestinal Research** recognizes scientists who have carried out highly meritorious research in gastrointestinal or liver physiology. The recipient receives a commemorative plaque, a \$500 award and presents an award lecture at the section's annual business meeting/reception that occurs during Experimental Biology.

Neural Control and Autonomic Regulation

The **Michael J. Brody Young Investigator Award of the APS Neural**

Control and Autonomic Regulation Section (\$500) is sponsored by Merck & Co. recognizes a promising young investigator who has made a significant research contribution to the understanding of neural control and autonomic regulation. The award is open to graduate students (post-candidacy exams), postdoctoral fellows, and clinical fellows who present and are first author on an abstract at Experimental Biology. Either the applicant or the abstract sponsor must be a member of APS. Applicants must mail a copy of the submitted abstract; the completed *APS Award Certification Form*; a list of publications; a one-page summary and evaluation of research contributions, written by the applicant and; a cover letter signed by both the applicant and sponsor indicating the date, or expected date, of highest degree. **The deadline for receipt of applications is December 30, 2000.** Send applications to Linda Allen, Membership Services, APS, 9650 Rockville Pike, Bethesda, Maryland 20814-3991.

The Neural Control and Autonomic Regulation (NCAR) Young Investigator Awards will provide travel support (\$500) to junior investigators to present meritorious research at the annual Experimental Biology meeting. To be eligible, the investigator must have PhD, MD or other professional degree with an academic rank or equivalent not higher than that of Assistant Professor and conduct either basic or clinical research in a field of neural control and autonomic regulation. Junior faculty members are particularly encouraged to apply for this award. To apply, the investigator must submit a first-authored abstract to any appropriate neural control topic of the Experimental Biology meeting. Award criteria will be based on current work reflected in the abstract and overall contributions to the field. A copy of the abstract and a CV from the investigator must be mailed by January 31, 2001 to the Member-at-Large of the NCAR Steering

Committee, Dr. William Talman, Professor, Department of Neurology, University of Iowa Hospital, 200 Hawkins Drive, Iowa City, IA 52242-1053. The abstracts will be judged by the NCAR Steering Committee and the most meritorious applications will be awarded.

Renal

The **Aventis Pharmaceutical Excellence in Renal Research Awards** are sponsored by Hoechst Marion Roussel and are designed to promote and develop excellence in research pertaining to molecular, cellular, or organ mechanisms involving the kidney. Awards are presented to two categories of students: predoctoral students (including graduate students and medical students) and postdoctoral fellows. Award recipients must be first authors on an abstract submitted to Renal and Electrolyte Physiology for programming at the EB meeting. Prior to the meeting, a first level of evaluation is conducted based on the submitted abstract. A subset of abstracts are further judged during oral presentation at the meeting. Award winners are announced at the annual renal dinner held in conjunction with the meeting and are presented with a cash prize.

The **Young Investigator Award for Excellence in Renal Physiology** recognizes an outstanding young investigator working in any area of renal physiology. Nominees must be less than 41 years old as of the date of the renal dinner or less than 15 years beyond receipt of their first doctoral degree.

The **Robert W. Berliner Award for Excellence in Renal Physiology**, sponsored by Abbott Laboratories, is given to an outstanding senior researcher and educator in renal physiology.

Teaching of Physiology

The Teaching of Physiology Section sponsors the **Arthur C. Guyton Physiology Teacher of the Year Award**. The award is sponsored by the W. B.

Section Awards

Saunders Company. Nominees must be full-time faculty members of accredited colleges or universities and members of APS. They must be involved in classroom teaching and not exclusively teaching graduate students in a research lab. Each nominee must be nominated by a member of APS. The nominator is responsible for completing application materials and forwarding copies to the chair of the Award Selection Committee. The person selected receives the award at the annual banquet of the Teaching of Physiology Section. The Teacher of the Year receives a certificate, an honorarium of \$1,000, and expenses of up to \$750 to attend EB.

The Teaching of Physiology Section (\$500) will provide two travel awards for outstanding posters presented in the Teaching of Physiology poster-discussion session at Experimental Biology '01. Submission of a poster to this session **does not** exclude the simultaneous presentation of a research poster or talk. (See the Teaching Section page of the APS website for additional information

about criteria for excellence in poster presentations.) To qualify for this award, the applicant must be first author on the poster, and age 40 or under **or** within ten years of receiving the PhD or MD. Applicants must also be APS regular, affiliate, or student members. Abstracts will be reviewed and rated by the Teaching Section Steering Committee. All poster abstracts must be formally submitted to EB by the application deadline. To apply for this award, please send a copy of your abstract submission and a completed APS Award Certification Form to: Linda Allen, Membership Services, 9650 Rockville Pike, Bethesda, MD 20814-3991. Deadline for application is **November 6, 2000**.

Water and Electrolyte Homeostasis

The Young Investigator Award in Regulatory and Integrative Physiology was established to encourage young investigators to continue research

careers in regulatory and integrative physiology. The award is presented annually at the business luncheon of the Water and Electrolyte Homeostasis Section to a young investigator (<40 years old) who has made important contributions to our understanding of the integrative aspects of cardiovascular, renal, and neuroendocrine physiology in health or disease. The award consists of \$500, a plaque, and complimentary registration to the EB meeting. The recipient of the award is invited to present a short lecture on his/her research during a scientific session of the EB meeting. Any member of APS in good standing may apply or be nominated for the award. Applications will be reviewed by the Section's Award Committee and should include a curriculum vitae of the nominee, a brief (one-page) summary and analysis of the research contributions of the nominee, a complete list of publications, and two letters of nomination from members of APS. ❖

APS Sustaining Associate Members

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



Abbott Laboratories
ADI Instruments
American Medical Assoc.
Astra Arcus USA, Inc.
Axon Instruments, Inc.
Berlex Biosciences
Gould, Inc.
The Gatorade Company

The Grass Foundation
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Janssen Research Foundation
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Merck and Company, Inc.
Nycomed, Inc.
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Pharmacia and Upjohn, Inc.
Procter & Gamble Co.
Rhône-Poulenc Rorer
W. B. Saunders Company
Schering-Plough Res. Inst.
G. D. Searle and Company
SmithKline Beecham Pharm.

AAAS Mass Media Fellowship Reports

Three APS student members spent last summer as Mass Media Science and Engineering Fellows in a program organized and administered by the American Association for the Advancement of Science (AAAS). The program places advanced students in the sciences and engineering in the newsrooms of major media outlets as apprentice science writers for ten weeks over the summer. The APS sponsored Susan Rainey, and the AAAS sponsored Kendall Powell and Pamela Hanson. In the articles below, the fellows recount their experiences at the media outlets.

APS will again sponsor a AAAS Mass Media Fellow in 2001. Applications will be accepted through January 15, 2001 for next summer's Fellowship program. For further information, see page 448, or visit the Student Awards page on the APS website (http://www.the-aps.org/awards/awd_student.htm).

Susan Rainey

APS AAAS Mass Media Fellow
Newsweek

It was just over a year ago that I first saw an advertisement from the APS and the AAAS for the Mass Media Science and Engineering Fellowship. I immediately knew this was for me. So often I've watched or read science stories on TV, in magazines, or in the newspaper, and felt the need for more—more stories, more details, more accuracy, more perspectives. But how could I, as a scientist, contribute? Now, thanks to the Mass Media Fellowship, I've had the opportunity to learn about science journalism first hand.

I spent this summer at *Newsweek* magazine in New York. Since I'm nearing the completion of my PhD in Physiology at the University of Toronto, I wondered whether this was a good time to take a summer "leave of absence." Now that I'm back, I can absolutely say yes, this was an invaluable opportunity. Not only has it developed my skills in explaining complex scientific issues to the general public, it

has also opened up opportunities for the future, in combining science with journalistic endeavors. I believe this is an important contribution to hearty and successful research programs. Science is not only about generating data in the laboratory; communicating the meaning of scientific discoveries to the general public is more important than ever. While some may think of science journalism as an educational tool, or as entertainment, it has become much more than just sharing our fascination of how the world works. Scientific research is affected more and more by public opinion and political decisions, which can affect what we can and can't do in the laboratory, the direction of research projects, and of course, funding. If the general public can't relate to today's scientific developments, doesn't care about them, or are ill-informed, then the scientist at the bench will ultimately suffer.

With a weekly readership of over 22 million, stories at *Newsweek* really do reach a "mass" audience. It's quite a different feeling than publishing scientific papers, which will be read by a relatively small group of specialists in your field. And while it can be frustrating working at a weekly magazine whose main focus is not science, but politics and current affairs, the respect that it has and the wide audience that it reaches generates a lot of feedback from readers (they receive thousands of letters to the editor each month). So many people were fascinated with the science stories that we ran and would write with further questions! For many readers, this was one of the only ways that they heard about new scientific developments or health issues.

There are some interesting adjustments to be made when switching from lab work to becoming a reporter. Scientists do their research by reading, experimenting, and analyzing, while journalists interview people, and talk to "sources." Scientists work in a time frame of years, while for journalists the time frame is a matter of days. And

spending your days on the telephone and at the computer is a world apart from donning latex gloves and running gels. But to my delight, as well of that of many of my PhD colleagues, so many of the skills acquired in graduate school really are useful outside of academia - skills such as reading, analyzing, questioning, critical thinking, resourcefulness, and independence.

Whether or not any of the scientists in the program this year or in years to come continue on in journalism as a career, I think that the importance of the Mass Media Fellowship is that it vitally strengthens the ties between scientists and journalists. This is crucial if we are to effectively communicate scientific issue to a mass audience. We have to learn from each other and try to understand how the other works, learn about each others language, methods, and restraints, so that we can work together effectively to get our messages, our ideas, our discoveries the recognition they need and deserve.

Kendall Powell

AAAS Mass Media Fellow
Los Angeles Times

I am a fourth-year graduate student in the Biomedical Sciences program at UC, San Diego. My undergraduate research was in physiology and currently I work in a membrane fusion lab that uses the budding yeast, *S. cerevisiae*, as a model system. I was given the opportunity to take a break from life at the bench and participate in the AAAS Mass Media Fellows program this past summer. I was assigned to work with the Science and Medicine Editor at the *Los Angeles Times*. Over the course of the summer, I wrote nine articles (two daily stories and seven feature articles) including medicine, life science, and physical science stories. I also learned the ropes of science writing from some of the top science and medical writers in the country. The following describes my perspective upon completing the summer:

Since sixth grade the Scientific

AAAS Mass Media Fellowship Reports

Method has been a big component of my academic life. I cannot remember how many times I have heard it—and the biology paradigm, the Central Dogma—described at the beginning of courses. These concepts are part of who I am. And now, as familiar as it is to me, I am discovering the existence of a whole new branch, extension, or extrapolation, if you will, of the scientific method. It's called journalism.

The AAAS Mass Media program has exposed me to a side of science that is rarely experienced by most bench scientists. By learning how science is communicated to the public I have grasped a better appreciation of what issues are important to the public and what the driving forces are on Wall Street and Capitol Hill that shape the trends in research. I have heard the frustration in the voice of the researcher who is working on determining the cause of a California oak tree epidemic on a shoestring budget. I have responded to emails and calls from stroke victims who are desperate to get into the first major clinical trial of a stroke rehabilitation therapy. I have interviewed big drug companies, little drug companies, and research institutions all claiming to have the best version of a drug—which one does the public get and is it really the best?

One source asked me over the phone, "What makes a science or medical news story news?" I had to admit, "I'm trying to figure that out for myself!" I struggled with this concept throughout the summer. My editor dismissed ideas that I thought would make great science pieces—direct evidence for the prion hypothesis and the structure of the ribosome—as too complicated and uninteresting for the public. Proof that prions are a new form of infection, one we do not understand very well compared to bacterial and viral infections, is uninteresting? I'll admit the concepts of misfolded, infectious proteins and RNA catalysts would be a challenge to explain. However, I also believe that sometimes journalists sell the public

short. Besides, I think that I, like most scientists, would almost always rather work on a challenge!

I have found when talking with friends or relatives that most of them are fascinated by complex biological concepts once they have been explained in a comprehensible manner. Not only are people interested, but they also have a growing need to understand complex science issues. This summer's human genome announcement has everyone in the public wondering, "What does it all mean?" Investors need to be able to determine if a biotech company is based on a solid idea or a risky, but potentially high-payoff one.

So, I reiterate that journalism is an extrapolation of the scientific method. Journalists take what the scientists know and have observed and speculate about what part of their discovery is meaningful to the world at large. Science writers take away the technical to uncover the extraordinary. They translate the scientist's passion and enthusiasm for their work into popular excitement for science. It is sad and alarming that most scientists never get to participate in this arm of the scientific process. After all, shouldn't the translators and extrapolators be well-trained scientists? No one would dream of trying to make a career of being a Russian translator for an important diplomat without first being fluent in the language. I suppose it could be done, picking up things along the way out of necessity, but it would be a far less efficient and more error-prone way to go about it.

In fact, I would guess that lack of scientific training is the major reason misinformation and errors get propagated in science news. It becomes evident when a journalist does not understand the scientific process or issues behind a story. In one recent example I came across, a writer described \$50,000 as a 'windfall' for a research project involving over 30 people. If the writer knew the scope of the project, the cost of the methods used in the project, and that

some of the researchers' salaries were being paid from the sum, surely she would have described it as a drop in the bucket rather than a windfall! I came across another example where misinformation was fueling public misconceptions. A wire story confused the difference between fetal tissue (which comes from aborted fetuses) and embryonic stem cells (which usually come from excess embryos from in vitro fertilization clinics). This distinction may not have seemed important to the writer, but it most certainly is important given the questions surrounding these areas of research. One poorly informed writer can cause major damage—I learned this lesson both by example and personally!

If anything, grad school has taught me to ask the right questions. It is a skill that is imperative in order to be successful in science. And from the examples above, it is also imperative to science writing. In this way I felt very prepared to interview scientists and doctors about their work. On many occasions, I was told, "You've hit it right on the head" or something similar. However, as a journalist, one must also learn to step outside of the black box of research and ask the bigger questions. This is something that, although I recognized, I also found very challenging to do.

On a couple of occasions, I got so wrapped up in the science behind a story that I overlooked major problems and issues. For a story on proton beam radiation therapy, I was so amazed at the physics behind this therapy that I lost sight of a critical issue for patients and doctors. There's only one place in the country where proton therapy is offered and it is expensive compared to traditional x-ray therapy that the vast majority of patients receive. While I was toting the benefits of using protons, I was infuriating doctors who were effectively treating patients with affordable and accessible x-ray therapy. I had not even come close to achieving a balanced story.

One of the writers at the *Times* summed it up pretty well, "The best

AAAS Mass Media Fellowship Reports

way to learn those lessons is by experiencing them!" And I have the AAAS Mass Media program to thank for allowing me to learn by experience. I have learned so much about journalism but also about the broader scientific process that I am both a better writer and a better scientist for my participation.

Pamela K. Hanson

AAAS Mass Media Fellow
The Chicago Tribune

I spent the summer slowly scrapping my way up the steep part of the learning curve. Despite the aid of my editors and other mentors at the *Chicago Tribune*, I still have a long way to go.

Science writing is not easy, and as scientists learn more about how the world works, the task will only become more difficult.

Chicago Tribune writer Ron Kotulak explained to me that in the course of his career, he has seen the goal of science writing evolve. Early on, a science writer's aim was to convey the latest research results to readers. Now, in an age of broad-reaching wire services, it is more important for writers to delve

into stories with greater depth. This approach helps identify long-term trends and avoids the confusing morass of day-to-day "breakthroughs."

As the amount of scientific knowledge grows at a seemingly exponential rate, it has become more important than ever to facilitate communication between scientists and the public. By sending scientists to work with organizations like the *Chicago Tribune*, the AAAS Mass Media Fellowship does that very thing.

Not only does the fellowship encourage the media to continue including science in their reporting, but it also gives a few lucky scientists the opportunity to try their hand at a craft sometimes derided by the scientific community.

Fortunately, the public thirsts for quality scientific information. They search the internet, the radio-waves and newspapers, hoping to find it.

Although the *Tribune* does not have a dedicated science page or section, it is chock full of science reporting. These articles appear everywhere from the national and local news sections to the Business and Technology section.

Thanks to the tireless efforts of science editor, Peter Kendall, a fair amount of science even makes the front page. Peter regularly pitches stories at the daily, four o'clock meeting where the managing editor decides which handful of articles to feature in this coveted space.

Over the course of the summer, a talented team of writers and editors helped me grapple with words in an effort to communicate science to the public, one story at a time. Ultimately, I produced about an article a week, and learned more than I ever imagined.

Despite the tremendous insight I gained into the world of science journalism, some of my questions remain unanswered. For example. . .

Is a sense of drama genetic? Can a person learn how to devise useful and creative analogies? Or is it a gift that some people have and others can never hope to acquire?

Although I may never solve these mysteries nor master the art of science writing, there is no doubt in my mind that I have grown and improved as a communicator of science. ❖

APS to Sponsor 2001 Mass Media Fellowship

The APS will again sponsor an American Association for the Advancement of Science (AAAS) Mass Media Science and Engineering Fellowship during the summer of 2001.

Approximately two dozen AAAS Mass Media fellows will spend 10 weeks during summer, 2001, working in the newsrooms of newspapers, magazines, Internet news outlets, or radio or television stations. Fellows receive a short training course in science journalism prior to the fellowship. During the summer they develop their ability to communicate complex scientific issues to non-scientists and improve public understanding of science. The AAAS arranges placements at participating media outlets. The fellowship includes travel to Washington for orientation and

evaluation sessions at the beginning and end of the summer, travel to the job site, and a weekly stipend.

Individuals must be currently enrolled as a graduate or postgraduate student of physiology or a related discipline to apply for the APS fellowship. Additional fellowships are available for students in other scientific and engineering disciplines. Information about the program is posted on the AAAS Education and Human Resources Directorate website at http://ehweb.aaas.org/ehr/3_4_0.html. The application form is available from the AAAS website or in the Awards for Students section of the APS website at http://the-aps.org/awards/awd_student.htm. A brochure with additional information is posted on both web sites.

In addition to the application form, applicants must submit a current résumé, a writing sample directed to the general public, transcripts of graduate and undergraduate work, and three letters of recommendation. The selection process is designed to seek out qualified candidates especially from under-represented communities, including African-Americans, Hispanics, and Native Americans, as well as scientists with disabilities.

The application deadline is January 15, 2001. For more information or to receive a copy by mail, contact Alice Ra'anana, APS Office of Public Affairs. (Telephone: 301-530-7105. E-mail: araanana@aps.faseb.org.) ❖

Scientists Urged to Comment on USDA Pain and Distress Regulations

The USDA is currently accepting comments on how pain and distress should be addressed under the Animal Welfare Act. The comment period ends on November 7.

Scientists are strongly urged to comment on this issue, which will affect how research protocols are evaluated in terms of their potential to cause pain and distress. This information is also included in each institution's annual report to the USDA, and state-by-state totals of animals used in painful procedures are published in a report to Congress. Because these numbers are made public, they are also a focal point of animal activists' programs, including a campaign by the Humane Society of the United States with the stated goal of ending pain and distress in laboratory animals by the year 2020.

The APS letter of comment to USDA was still under development at the time of this writing. Upon completion it will be posted to the APS website at http://www.the-aps.org/pub_affairs/issues/pa_pain_distress.htm. You may wish to refer to this letter in writing your own response.

The APS comments are being developed based upon discussions that took place at a workshop that was organized by the APS in conjunction with the Federation of American Societies for Experimental Biology (FASEB). The August 6-7 workshop brought together research scientists, veterinarians specializing in laboratory animal medicine, and others involved in the research

process. It included presentations from scientists who study pain, fear, and distress, followed by small group discussions of the science and policy questions raised by the USDA in its *Federal Register* notice.

Although the FASEB workshop did not result in a formal consensus document, a number of common themes emerged. Problems were noted with the existing USDA pain and distress classification system and improvements were suggested. However, participants agreed that the USDA should avoid a prescriptive system, such as some of the models the agency is considering. Instead of such a system that assigns specific research procedures to a particular pain and distress category, it is in the best interest of both animal welfare and research progress for local IACUCs to retain responsibility for determining the appropriate pain and distress categories for the protocols they review. Furthermore, the best way to enhance the stewardship of animals is to foster a partnership among scientists, veterinarians, veterinary technicians, animal husbandry staff, IACUCs, government and professional associations.

The USDA should also make certain that its regulations and policies are simple, scientifically based, and consistent with other oversight, such as the Public Health Service Policy on Humane Care and Use of Laboratory Animals and the *Guide for the Care and Use of Laboratory Animals*. Regulations should be performance-based and

should be sufficiently flexible to allow for changes in practice as scientific advances occur. Changes should only be made if they are scientifically valid and clearly benefit animals. The administrative costs and regulatory burden of new requirements should also be considered.

Although it is not specified in the Request for Comments, the USDA's Animal Plant and Health Inspection Service (APHIS) has already formulated a definition of distress as "a state in which an animal cannot escape from or adapt to the internal or external stressors or conditions it experiences, resulting in negative effects on its well-being." Objections were raised to this definition because of the vague language that could lead to widely varying, highly subjective interpretations. Participants were also concerned that it would be difficult for IACUCs to use. Some questioned whether a regulatory definition of distress is even needed since IACUCs already try to take into potential for causing distress into account.

To obtain a copy of the complete USDA notice, "Request for Comments on "Definitions For and Reporting of Pain and Distress in Laboratory Animals," visit the USDA website at <http://www.aphis.usda.gov/ppd/rad/webrepor.html>. Scroll down to July 10, 2000, which is the day it was published. Note that the comment period was subsequently extended until November 7.

APS Objects to Rats, Mice, and Birds Negotiations

APS has voiced its objections to USDA efforts to negotiate a settlement of a suit demanding that the agency extend Animal Welfare Act (AWA) protection to rats, mice, and birds. The negotiations came to light in August court filings following a judge's ruling

in June. The earlier decision by US District Court Judge Ellen S. Huvelle granted one plaintiff, Kristine Gausz, the legal standing to sue the government in the case known as *ARDF v. Glickman*.

The ARDF or Alternatives Research

and Development Foundation was founded five years ago and is affiliated with the American Anti-Vivisection Society. The ARDF filed suit in March, 1999, asking the court to force the USDA to include rats, mice, and birds along with other species subject to

AWA regulations. The suit was filed after the USDA published a *Federal Register* notice requesting comments on an ARDF petition which asked the agency to regulate rats, mice, and birds. The ARDF was joined in the case by In Vitro International, a company that develops, manufactures, and markets lab tests to replace animal testing, and by Gausz, who was identified as a student at Beaver College in Glenside, PA.

In the wake of Huvelle's June ruling, the National Association for Biomedical Research (NABR) petitioned the court to join the case as an "intervener" in order to represent the interests of researchers who use rats, mice, and birds in the suit. However, in late August, the USDA unexpectedly asked the court for 30 days to negotiate a settlement, and further court proceedings, including the NABR request, were delayed until September 25. NABR protested the USDA's negotiations with the ARDF, which are a sharp departure from usual rule-making procedures.

APS President **Gerald DiBona**, Past

The USDA has Animal Welfare Act (AWA) regulations to ensure that lost or stolen pets are not used in research. These regulations require dealers purchasing random source dogs or cats for sale to research facilities to obtain certification from the animal's owner acknowledging that the animal could be

President **Walter Boron**, and President-Elect **John Hall** sent a letter September 15 to Agriculture Secretary Dan Glickman urging the USDA to halt its efforts to negotiate an out-of-court settlement. The APS "objects to the USDA's efforts to resolve this issue through a negotiation that does not involve the research community, which would be directly affected by the outcome," the APS presidents said. They also noted that it was "unprecedented" to address a regulatory issue through negotiations.

"The APS strongly supports the humane use of animals in research," they wrote. "However, because the care of rats, mice, and birds at major institutions is already subject to stringent standards of care, we believe that bringing these species under the AWA regulations would increase paperwork without improving animal care."

The APS presidents pointed out that the overwhelming majority of medical research with rats, mice, and birds is already subject to the state of the art

Paper Trails Protect Pets

used for research or educational purposes. The dealer must provide this certification along with the animal to the research facility. The facility then must keep certification on file throughout the time that the animal is there and for three years afterwards.

The USDA verifies compliance

standards of humane care contained in the *Guide for the Care and Use of Laboratory Animals*, which is the required standard for research that is funded by the Public Health Service or conducted in an institution accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC).

"For major research institutions, the only real change that would take place if the USDA were to extend its current regulatory requirements to rats, mice, and birds, is that the volume of record-keeping and reporting paperwork would increase dramatically," they wrote. "Given that time and money are always limited, the net effect will be to reduce how much time animal care staff can spend with animals and how much research can be accomplished because research dollars would undoubtedly be diverted toward compliance."

For the complete text of the APS letter, see http://www.the-aps.org/public-affairs/issues/pa_pain_distress.htm. ❖

through "traceback" audits conducted by its inspectors. This enables the USDA to provide the public with assurance that random source dogs and cats were legally acquired from informed owners in accordance with AWA regulations. ❖

NIH Seeks Comments on Grant Form Revisions

On September 5, 2000, the NIH Office of Extramural Research published a notice in the *NIH Guide to Grants and Contracts* requesting comments and suggestions on how to revise the PHS 398 and 2590 grant applications. These forms are used to request Federal assistance for research and research-related training from PHS agencies. They are used by the NIH, Agency for Healthcare Research and Quality, Agency for Toxic Substance and Disease Registry, Centers for Disease Control and Prevention, Food

and Drug Administration, and the Indian Health Service.

In its notice, the OER requested written comments and suggestions on two specific topics: 1) ways to enhance the quality, utility and clarity of the instructions; and 2) ways to minimize the burden of filling out the application while still maintaining the "effectiveness" of the forms. The OER also indicated that it would accept other comments and recommendations about how the forms might be revised.

Comments will be accepted until

November 4 and should be sent to 398Revi@od.nih.gov or may be posted to the interactive feedback form at <http://grants.nih.gov/cfdocs/398/feedback.cfm>. Inquiries may be directed to Jan Heffernan, Program Analyst, with the Project Clearance Branch at the Office of Policy for Extramural Research Administration/OD. Her mailing address is 6705 Rockledge Drive, Rm. 1196, Bethesda, MD 20892-7974. Her telephone number is 301-435-0940, and her email address is Heffernj@od.nih.gov. ❖

APS Web News

New Web Site, New URL

APS is excited to announce its completely redesigned web site and its new URL <http://www.The-APS.org>.

The website became available to the public October 1, ending a five-month project and completing the Society's first step in revamping its web-based technology. The new site has a clean look that simplifies navigation. A reduced number of images decreases the loading time, and the new server, implemented earlier in 2000, increases the speed of the searches. Completing this step will allow APS to implement a complete array of web-based forms, ranging from award and membership applications to journal subscriptions.

Visit our site at <http://www.The-APS.org>! Check back often to see what

is happening at APS and don't forget to reset your bookmarks. ❖



Books Received

Atlas of Functional Neuroanatomy

Water J. Hendelman.
Boca Raton, FL: CRC, 2000, 258 pp.,
illus., index, \$39.95.
ISBN: 0-8493-1177-2.

Development, Function and Evolution of Teeth

Mark F. Teaford, Moya Meredith Smith,
and Mark W. J. Ferguson (Editors).
New York: Cambridge Univ. Press, 2000,
314 pp., illus., index, \$100.00.
ISBN: 0-521-57011-5.

Hearing: Its Physiology and Pathophysiology

Aage R. Moller.
San Diego, CA: Academic, 2000, 515
pp., illus., index, \$79.95.
ISBN: 0-12-504255-8.

Image Analysis Sourcebook

John Keith Beddow.
Santa Barbara, CA: Am. Univ. Sci. &
Technol., 1997, 390 pp., illus., index,
\$110.00.
ISBN: 0-9617531-7-X.

Lung Surfactants: Basic Science and

Clinical Applications.

Robert H. Notter.
Lung Biology in Health and Disease.
New York: Dekker, 2000, 444 pp., illus.,
index, \$150.00.
ISBN: 0-8247-0401-0.

Neuronal Growth Cones.

Phillip R. Gordon-Weeks.
Developmental and Cell Biology Ser.
New York: Cambridge Univ. Press, 2000,
260 pp., illus., index, \$90.00.
ISBN: 0-521-44491-8.

Pulmonary and Peripheral Gas

Exchange in Health and Disease.
Josep Roca, Roberto Rodriguez-Roisin,
and Peter D. Wagner (Editors).
Lung Biology in Health and Disease,
Vol. 148.
New York: Dekker, 2000, 822 pp., illus.,
index, \$225.00.
ISBN: 0-8247-0335-9.

Rome II: The Functional Gastrointestinal Disorders, 2nd Ed.

Douglas A. Drossman, Enrico Corazziari,
Nicholas J. Talley, W. Grant Thompson,
William E. Whitehead (Editors).

McLean, VA: Degnon, 2000, 764 pp.,
illus., index, \$79.95.
ISBN: 0-9656837-2-9.

Sleep Apnea: Implications in Cardiovascular and Cerebrovascular Disease.

T. Douglas Bradley and John S. Floras
(Editors).
Lung Biology in Health and Disease,
Vol. 146.
New York: Dekker, 2000, 554 pp., illus.,
index, \$195.00.
ISBN: 0-8247-0299-9.

Textbook of Endocrine Physiology, 4th Ed.

James E. Griffin and Sergio R. Ojeda,
Editors.
New York: Oxford Univ. Press, 2000,
479 pp., illus., index, \$31.95.
ISBN: 0-19-513541-5.

Unconventional Collagens.

Sylvie Ricard-Blum, Bernard Dublet, and
Michel van der Rest.
New York: Oxford University Press,
2000, 155 pp., illus., \$60.00.
ISBN: 0-19-850545-0.

Positions Available

Postdoctoral Fellow: The Center for Cell and Molecular Signaling at Emory University is seeking a postdoctoral fellow to join studies of ion channels defective in cystic fibrosis. The focus of this specific project is to develop an understanding of the mechanisms of permeation and gating in the CFTR channel, using a structure/function approach (see *J. Exp. Biol.* 203: 1947-1962). Jointly with the Principal Investigator, the candidate will plan and perform experiments using molecular biological and biochemical approaches and electrophysiological analysis of channels expressed in oocytes and/or mammalian cells. Experience in electrophysiological methods (two-electrode voltage clamp, single-channel patch clamp) and/or molecular biological techniques is required. Training will be provided where experience is lacking. A quantitative and experimental background is strongly desired. The candidate must be interested in performing experiments. The position is available immediately. Send curriculum vitae plus contact information for three professional references to: Dr. Nael A. McCarty, Department of Physiology, Emory University School of Medicine, 1648 Pierce Drive, Atlanta, GA 30322. Tel: 404-727-1372; fax: 404-727-2648; email: nmcc@physio.emory.edu.



Associate or Assistant Professor: The Departments of Biophysics and Physiology at Boston University School of Medicine seek an experienced teacher and scientist to join our faculty at the Associate or Assistant Professor level. The appropriate individual is expected to have considerable experience in the teaching of human physiology at the medical or graduate level. The primary responsibility will be to assist in the teaching of a team-taught, organ system-based Medical Physiology course offered to our first-year medical class. The course is taught in a lecture and laboratory/discussion format, which runs from February to June and consists of four 4.5-hour sessions per week. Additional teaching assignments in dental physiology and a two-semester undergraduate course may also be necessary. An active research program would be an advantage but is not required. The area of research is open. Departmental research interests include cell and structural biology. Applications including a letter with a brief description of teaching experience and philosophy, a curriculum vitae, and the names of three references should be forwarded to: Dr. Paul O'Bryan, Department of Physiology, Boston University School of Medicine, 715 Albany Street, Boston, MA 02118-2526. Email: obryan@bu.edu. [EOE]

Postdoctoral Positions: Two positions are available immediately in a laboratory in the Department of Medicine at the Mayo Clinic in the area of hepatic vascular biology. The focus of the laboratory is to understand the regulation of nitric oxide production in the liver with an emphasis on regulation of endothelial nitric oxide synthase as it relates to cirrhosis and portal hypertension. The first position focuses on the molecular regulation of endothelial nitric oxide synthase. Expertise in cellular biology including immunofluorescence techniques and cell fractionation is required, as well as experience in standard biochemistry and molecular biology techniques. The second position focuses on nitric oxide, hepatic hemodynamics and experimental models of liver disease. Experience with in vivo hemodynamic measurements and in vitro pharmacology in rodent models is required. Please forward curriculum vitae and letter of interest to: Vijay Shah, MD, Alfred 2-435 GI Research Unit, Mayo Clinic, Rochester, MN 55905. Email: shah.vijay@mayo.edu. [EOE/AA].

Senior Research Assistant: The Department of Internal Medicine, Hematology/Oncology Division, University of Iowa College of Medicine, is seeking a Senior Research Assistant to support and conduct complex experimental research in the natural or health sciences. This person will function as a specialist or technical expert on one or more phases of the project(s) directed towards measuring levels and activities of novel therapeutic agents in biological samples, discerning the mechanisms that underlie these activities, and assisting in the management of one or more phases of the research and development efforts. This position requires the academic knowledge of a field or discipline generally associated with a Master's degree plus advanced study and accumulated knowledge of application in a field of learning or an equivalent combination of education and progressively responsible work experience. Qualities desired include considerable (3-5 years) experience with the following methods: tissue culture techniques, cell proliferation assays, clonogenic assays, enzymatic assays, protein fractionation, molecular biology techniques (including RT-PCR, Northern blot hybridization, RNA isolation, gel electrophoresis, cDNA preparation and cloning, and in situ hybridization), and immunohistochemical techniques (including light, confocal, and electron microscopy). Please send resume and cover letter indicating #44431 to: Carol Webby, Human Resources, Internal Medicine, E400 GH, 200 Hawkins Drive, Iowa City, IA 52242-1081. Women and minorities are strongly encouraged to apply. [AA/EOE]

Positions Available

Postdoctoral Position: The Department of Physiology, The University of Tennessee, Memphis, has a position available immediately to study local and global calcium signaling in arterial smooth muscle: modulation of sarcolemmal ion channels and regulation of cellular contractility (for review see Jaggar et al., *Am. J. Physiol.* 278: C235-C256, 2000). Qualifications include a PhD in physiology or a related field. Experience with patch-clamp, confocal microscopy, or calcium fluorescence is beneficial. Please send a curriculum vitae and three letters of reference to: Jonathan H. Jaggar, PhD, Department of Physiology, University of Tennessee, Memphis, 894 Union Avenue, Suite 426, Memphis, TN 38163. Fax: 901-448-7126; email: jjaggar@physiol.utmem.edu. The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA employer.

Biological Science Assistants: The US Army Research Institute of Environmental Medicine (USARIEM) in Natick, MA has multiple positions available for qualified Biological Sciences Assistants. USARIEM conducts basic and applied research concerning optimization of performance under stressful conditions and avoidance of associated medical problems. The positions require enlistment into the US Army for six years with the assignment at USARIEM, which is in the Boston suburbs. Educational requirement is a Bachelor's or Master's Degree in biology, physiology, microbiology, exercise science, nutrition, biomechanics or biochemistry. Applicants should have a history of high academic achievement and be highly motivated. Previous experience as a research technician employing procedures related to either human, animal, tissue and/or molecular research is desired. Benefits include student loan repayment of up to \$55,000, housing, medical care, graduate educational opportunities, as well as excellent research experiences in a variety of scientific disciplines, including environmental and exercise physiology, nutrition and metabolism, pathophysiology, genomics, and molecular biology. The open positions are located in the Military Performance Division, Military Nutrition Division, and Thermal and Mountain Medicine Division. Candidates can obtain further information by sending a letter of interest and resume or CV to: Dr. Kent B. Pandolf, Senior Scientist, US Army Research Institute of Environmental Medicine, Natick, MA 01760-5007. Tel: 508-233-4832; Email: Kent.Pandolf@na.amedd.army.mil.

Research Physiologist: The Thermal and Mountain Medicine Division, US Army Research Institute of Environmental Medicine invites applicants for a Research Physiologist Position. Applicants should have a strong background in systems/integrative physiology; experience with molecular/genomics research and physiological simulation modeling are desirable. Applicants should have postdoctoral experience with a strong record of publications and grant writing. This is a civilian (contingent to six years) position that could become permanent; salary range of \$51,9898 to \$80,367 depending on qualifications. The successful candidate will develop a human research program regarding thermoregulation, physical performance, adaptations and maladaptations to cold exposure. Thermal and Mountain Medicine Division consists of approximately 50 scientists organized into program units studying Cold Stress Physiology, Heat Stress Physiology, Mountain Stress Physiology, Environmental Genetics and Environmental Pathophysiology. Women and minorities are strongly encouraged to apply. Send curriculum vitae to Dr. Michael N. Sawka, Chief, Thermal and Mountain Medicine Division, US Army Research Institute of Environmental Medicine, Kansas Street, Natick, MA 01760-5007. Tel: 508-233-5665; Email: michael.Sawka@na.amedd.army.mil.

Animal Physiologist—Ecological Toxicologist: The Department of Biological Sciences at Capital University in Columbus, Ohio, invites applications for a tenure-track position at the assistant professor level in Animal Physiology—Ecotoxicology to begin Fall 2001. Candidates should possess a PhD at the time of appointment. We are seeking a collegial animal physiologist with a specialization in ecological toxicology and a strong commitment to liberal arts undergraduate education. A background in environmental chemistry, invertebrate physiology, numerical modeling, and/or environmental risk assessment would be an asset to the position. The successful candidate will be expected to teach across the curriculum and mentor undergraduate research projects. Send applications (curriculum vitae, copy of transcripts, three letters of reference, and a statement of teaching and research experience, teaching philosophy, and interests) to: Dr. Terry Lahm, Chair of the Search Committee, Department of Biological Sciences, Capital University, 2199 East Main Street, Columbus, OH 43209-2394. Inquiries may be directed to Dr. Lahm at 614-236-6800 or tlahm@capital.edu. Review of applications will begin December 1, 2000. More information on Capital University and the Department of Biological Sciences may be obtained at <http://www.capital.edu/arts/biology/biology.html>. Applications from women and minorities are strongly encouraged. [EOE]

Positions Available

Systems Biologist: An immediate job opening is available with Entelos, Inc. Entelos provides computer-based disease simulation models called Entelos PhysioLabs, which simulate the physiology of disease and the consequences of interventions. Entelos is seeking life scientists for systems biologist positions on our Adipocyte CytoLab Development Staff. The systems biologist works with biologic modelers and other systems biologists to develop and assess our mathematical models. He/she evaluates and interprets data, describes relevant biochemistry and physiology, finds literature references to build and support the model, writes synopses of the physiology and pathophysiology, and evaluates model simulations. The systems biologist instructs other team members and customers on the relevant physiology and in use of the model. The ideal candidate would have a PhD in physiology, biochemistry, diabetes, nutrition, or endocrinology; 2-3 years of experience in pharmaceutical, biopharmaceutical, government, or academic research setting; a deep understanding of lipid metabolism, adipocyte metabolism, or hormone signaling; knowledge of the metabolic and endocrine derangements that occur in obesity or diabetes; experience in integrating multidisciplinary research with perspectives ranging from clinical medicine to molecular biology; a clear understanding of experimental protocols, methods, and designs; very strong communication skills, both oral and written, including technical writing and presentation; the ability to work in a diverse, cross-functional team environment; comfort with college mathematics and literature search engines; an interest in teaching with significant experience in academic or professional settings; an interest in pursuing a technical career path outside a wet lab environment; and strong leadership, communication, facilitation and presentation skills and an enjoyment of understanding key details while thinking broadly about whole systems. Upon hiring, proof of eligibility to work in the US is required. For more information, please contact: Director, Human Resources, Entelos, Inc., 4040 Campbell Avenue, Suite 200, Menlo Park, CA 94025. Fax: 650-330-5262; email: jobs@entelos.com; Internet: <http://www.entelos.com>. [EOE]

Senior Research Officer: An opportunity exists for a career research scientist to join the research team in the Department of Respiratory Medicine at Westmead Hospital, a research center of the Westmead Millennium Institute in Sydney, Australia. This National Health and Medical Research Council-supported position offers the successful candidate an opportunity to develop a research program in the fields of respiratory physiology, upper airway physiology, and/or sleep medicine. The appointee will act as team leader for the Department's animal-based research projects, as well as contributing to both strategic and operational aspects of basic and applied research across the spectrum of the Department's research activities. Essential skills/knowledge include a PhD in respiratory physiology or related area, excellent oral and written communication skills, the ability to work effectively in a team environment, the ability to write to a standard for publication in academic journals, good organizational and interpersonal skills, demonstrated attention to detail, and excellent analytical and problem-solving skills. Desirable skills/knowledge include experience in respiratory physiology research, experience in animal-based research, advanced computer skills, and bioengineering skills. This full-time position, offered at the level of NH&MRC Senior Research Officer, is available initially for one year with potential for a further 12 months. Further continuance will, in part, be dependent on the applicant's ability to attract funding. Closing date: Monday, **October 9, 2000**. For enquiries, contact: Dr. Terry Amis, Tel: +02-9845-6797, email: terencea@westgate.wh.usyd.edu.au. Send applications to: Ms. Kath Butler, Clinical Sciences, Westmead Hospital, Westmead, New South Wales, 2145 Australia. Tel: +02-9845-6018; email: kathb@westgate.wh.usyd.edu.au.

Postdoctoral Position: A postdoctoral position available immediately. Project involved understanding diabetic vascularopathy in a mouse model. Study approaches involve normal and transgenic/knockout mouse models using microvascular perfusions coupled with microscopic imaging of tissues and cellular and molecular analyses. Experience in small-animal surgery, immunocytochemistry, Northern and Southern blotting, PCR, gel electrophoresis, cloning,

sequencing, and mouse genetics is highly desirable. Interested candidates should send a letter of interest and experience along with a resume to: John C. Rutledge, MD, Division of Endocrinology, Clinical Nutrition, and Vascular Medicine, University of California, Davis, One Shields Way, TB 172 Bioletti Way, Davis, CA 95616. Tel: 530-752-0717; fax: 530-752-3264; email: jcrutledge@ucdavis.edu.

Positions Available

Assistant Professor Tenure-Track: The Section of Cardiovascular Sciences, Baylor College of Medicine Department of Medicine, invites applications to participate in research relating to the cell molecular biology of cardiovascular injury and repair. Preference will be given to candidates with a broad understanding of cardiovascular injury from both a clinical and fundamental research perspectives. The applicant must have a strong background in cell or molecular biology and provide evidence of an independent research direction. Candidates should have a doctoral degree, a minimum of 3 years of postdoctoral training, and be prepared to establish an independent, extramurally funded program as well as participate in the graduate program. Salary is \$50,000+ commensurate with experience. Application should include a curriculum vitae, the names and addresses of 3 references, and a statement of research program. Please send to: Dr. Mark L. Entman, Section of Cardiovascular Sciences, Baylor College of Medicine, One Baylor Plaza, Houston, TX 77030. [AA/EOE]



Faculty Position, Department of Physiology: National University of Singapore invites applications for full-time tenure-track faculty positions in the Department. The Department of Physiology has teaching commitments to medical, dental, and science students and has an active graduate research program.

Faculty members have an excellent reputation in tumor biology, apoptosis, cell differentiation and development, iron transport, energy homeostasis, neuroscience, clinical physiology and drug target identification. The Department has close collaborative links with research institutes and biotechnology companies in Singapore and research groups internationally. We are looking for outstanding faculty members with an MD or PhD degree (or equivalent) and at least 2 years of postdoctoral experience. He/she is expected to teach human physiology at both undergraduate and graduate levels, conduct independent research, and compete successfully for research funding. Research experience in molecular biology, cancer biology, genomics, or proteomics will be an advantage. Remuneration will be commensurate with qualifications and experience. Interested parties should send applications, supported by a resume, detailed research plan, and 3 letters of references immediately to: Head, Recruitment Committee, Department of Physiology, Faculty of Medicine, National University of Singapore, 2 Medical Drive, Republic of Singapore 117597. Visit <http://www.nus.edu.sg/NUSinfo/Appoint/med-phys.htm> for information on the Department, the University, terms and conditions of service, and an application form. Only shortlisted candidates will be notified.

Postdoctoral Fellow or Research Associate: Postdoctoral or Research Associate needed to work on plasticity in the visual cortex, using slices of rat and mouse cortex. For a description of the general area, see Visual Development by Nigel Daw. We have implicated NMDA receptors, metabotropic glutamate receptors, and protein kinase A in plasticity in the visual cortex, using monocular deprivation in whole animals. This leads to questions about the mechanisms involved, which need to be answered by experiments at a more cellular level, in some cases utilizing mutant mice. The general goal of the laboratory is to investigate mechanisms of plasticity, not confined to the three factors listed above, with a combination of the most appropriate techniques. The appointee will work in a small laboratory within the neurobiology community at Yale. This community is known for work on development in general, and the visual system in particular. Candidates need a PhD or MD. Experience in electrophysiology is essential, and experience with whole cell recordings is desirable. The position will be filled within the next six months. Salary will depend on background. Qualified candidates should send a CV and covering letter by mail or email to: Nigel Daw, Department of Ophthalmology, Yale University Medical School, 330 Cedar Street, New Haven, CT 06520-8061. Email: nigel.daw@yale.edu

Chair, Department of Cell and Molecular Physiology:

The School of Medicine at the University of North Carolina at Chapel Hill is searching for an outstanding individual to provide academic and administrative leadership for the research and teaching programs of the Department of Cell and Molecular Physiology. This fine department has excellent facilities and strong collaborative relationships with other departments, research centers, and institutes within the University. Other academic and industrial institutions in the Research Triangle enhance the scientific environment, and the UNC Chapel Hill School of Medicine is enjoying robust growth. Minimum qualifications for this position include a PhD or MD degree and a distinguished record of scientific research and extramural funding. Consideration of candidates will begin immediately, and will continue until the search is successfully concluded. Applicants should submit a detailed curriculum vitae, a description of their administrative experience, research goals and teaching interests, and the names and addresses of four references to: Richard C. Boucher, MD, Chair, Department of Cell & Molecular Physiology Search Committee, C/O Office of the Dean, School of Medicine, CB # 7000, 243 MacNider Hall, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-7000, Attention: Bethany Cowan. Women and members of minority groups are encouraged to apply. [EOE]

Positions Available

Postdoctoral Position: Postdoctoral position is available in the Department of Biomedical Engineering at the Johns Hopkins University. Primary area of research is mechanisms of cardiovascular deconditioning associated with exposure to a zero gravity environment. The candidate will be involved in studies utilizing rodent models of cardiovascular deconditioning. Techniques will include integrated cardiovascular physiology and in vitro vascular studies including vascular imaging. Cellular mechanisms will also be investigated. Please contact Dr. Artin Shoukas, Department of Biomedical Engineering, Johns Hopkins University School of Medicine. Tel: 410-955-2871.

Tenure-Track Faculty Pharmacology Positions: The Department of Physiology of the Northeastern Ohio Universities College of Medicine (NEOUCOM) is seeking applicants to fill two tenure-track (assistant/associate professor level) positions in cardiovascular or pulmonary pharmacology. The Department has a cardiopulmonary research focus and invites applicants who are using modern cellular and/or molecular biology techniques to address integrative physiological problems that complement ongoing research programs. Of particular interest for one of the positions are candidates having skills in receptor binding methodology. Candidates must have a PhD and/or MD with appropriate postdoctoral fellowship training, a strong record of research accomplishment, and the ability to establish an independent externally funded program. Excellent opportunities exist within the department and institution for collaboration. Medical student teaching responsibilities will be to participate in teaching the medical pharmacology course. Department faculty are members of the graduate faculty in programs leading to the PhD through the School of Biomedical Sciences at Kent State University. The successful candidate will have the opportunity to develop graduate courses that relate to his/her specialty. Further information about the department and institution can be obtained from the NEOUCOM web site at <http://www.neoucom.edu>. Candidates should send a letter of application describing research experience and goals, accompanied by a curriculum vitae, and the names and addresses of three references by **October 1, 2000** to Human Resources: c/o Michael B. Maron, PhD, Professor and Chairperson, Department of Physiology, Northeastern Ohio Universities, College of Medicine, P.O. Box 95, Rootstown, OH 44272-0095. [AA/EOE]

Associate Professor, Exercise Science: A tenure-track appointment is available in the School of Exercise, Leisure and Sport, Kent State University, to begin August 2001 in exercise science with a specialization in physiology in an established program offering the PhD. The incumbent will teach advanced courses in exercise physiology and advise the research of students. A PhD in Exercise Science is required. The candidate must be qualified for full graduate faculty status and serve as an academic and research advisor to masters and doctoral students. Research interests should complement the research of present faculty (metabolism, nutrition, environmental physiology, and body composition); an opportunity may exist for research in the area of exercise and aging. Research competency must be demonstrated by related published research in the applicant's specialization. Pursuit of extramural funding is expected. Review of applicants will begin on November 20, 2000 and continue until the position is filled. Send a letter of application, curriculum vitae, three letters of reference, and five refereed articles that represent a focus of research to: Dr. Ellen Glickman-Weiss, School of Exercise, Leisure and Sport, Kent State University, 262 Gym Annex, PO Box 5190, Kent, OH 44242-0001.

Assistant Professor: The Department of Physiology, Louisiana State University Health Sciences Center, New Orleans seeks outstanding candidates for a tenure-track position at the Assistant Professor level. The successful candidate must have a PhD or equivalent, postdoctoral research experience, and a strong record of research accomplishments. We are seeking individuals with expertise in the pathophysiology of inflammation, shock, trauma, or infection, but other areas of interest will be considered. Expertise in modern molecular biological techniques and experience in regulatory mechanisms important to disease processes are desired. The successful candidate will be expected to maintain an active extramurally funded research program, to complement the existing research strengths of the department, and to participate in the department's teaching program. Excellent start-up package, competitive salary, state-of-the-art instrumentation, and opportunity to affiliate with existing Alcohol Research Center and Training Grant are available. Candidates should submit, by **November 15**, a curriculum vitae, a brief statement of research interests, and career goals and have letters of reference sent from at least three individuals who know the work of the candidate to: Dr. J. R. Lancaster, Jr., Chair, Search Committee, Department of Physiology, LSU Health Sciences Center, 1901 Perdido St., New Orleans, LA 70112. Email: [AA/EOE]

Biophysical Society Elects New Council

The Biophysical Society has elected seven new Council members, two of which are APS members, **Mordecai D. Blaustein** and **Susan Hamilton**. They have been elected to serve three-year terms (2001-2003) for the Society.

Mordecai D. Blaustein is the Professor and Chairman in the Department of Physiology at the University of Maryland. Blaustein conducts research in calcium and sodium transport, calcium homeostasis, and calcium signaling in neurons, glia and vascular smooth muscle and sodium-calcium exchange.

Susan Hamilton is the Professor and Interim Chair of Molecular Physiology and Biophysics at the Baylor College of

Medicine. Hamilton's research is in excitation contraction coupling in skeletal and cardiac muscle.



Mordecai D. Blaustein



Susan Hamilton

Accepting a position with the Department of Pharmacology, Merck Research Laboratories, West Point, PA, **Magdalena Alonso-Galicia** has moved from the Department of Physiology, Medical College of Wisconsin, Milwaukee, WI.

Steven Sung-Chur An has joined the Department of Physiology Program, Harvard University School of Public Health, Boston, MA. An was with the Department of Molecular Pharmacology, Physiology & Biotechnology, Brown University, Providence, RI.

Formerly with the Department of Surgery, Hospital of University of Pennsylvania, Philadelphia, PA, **Harry L. Anderson, III** is now with the Department of Surgery, St. Luke's Hospital, Bethlehem, PA.

Matthew Tucker Andrews has moved from the Department of Genetics, North Carolina State University, Raleigh, NC to the Department of Biochemistry and Molecular Biology, University of Minnesota School of Medicine, Duluth, MN.

Laurent Pascal Audoly has accepted a position with the Department of Inflammation, Pfizer Global Research

& Development, Groton, CT. Audoly was with the Department of Medicine, Duke University Medical Center, Durham, NC.

Joining the Department of Sport and Exercise Science, University of Bath, England, **Alan M. Batterham** has moved from the Department of Sport and Exercise Science, University of Teesside, Middlesbrough, England.

Harry Colbert Blair has accepted a new position with the Department of Pathology, University of Pittsburgh, Pittsburgh, PA. Blair formerly was with the Department of Pathology, University of Alabama at Birmingham.

Accepting a position as Professor and Chair, Department of Biology, Morgan State University, Baltimore, MD, **Ricardo A. Brown** has left his former post, the Department of Physiology, Wayne State University School of Medicine, Detroit, MI.

Currently the Director of Marshfield Medical Research & Education Foundation, Marshfield, WI, **Michael D. Caldwell** was formerly with the Department of Surgery and Biochemistry, University of Minnesota, Minneapolis, MN.

Irshad H. Chaudry was originally associated with Surgical Research, Brown University Rhode Island Hospital, Providence, RI. Currently, Chaudry is with the Center for Surgical Research, University of Alabama at Birmingham.

Associating with the Department of Physiology and Endocrinology, Medical College of Georgia, Augusta, GA, **Kanchan A. Chitale** has moved from the Department of Physiology, University of Michigan, Ann Arbor, MI.

Joining the Department of Scientific Peer & Advisory Review Service, American Institute of Biological Sciences, Sterling, VA, **William L. Daniels** has moved from Military and Emergency Medicine, Casualty Care Research Center, Uniformed Services University Health Science, Bethesda, MD.

Having accepted a position with the Division of Kinesiology, University of Minnesota, Minneapolis, MN, **Donald R. Dengel** has left the Geriatrics Research Education and Clinical Research, Ann Arbor VA Medical Center, Ann Arbor, MI.

People & Places

Accepting the position of Editor-in-Chief, *New England Journal of Medicine*, Boston, MA, **Jeffrey M. Drazen** has left the Department of Pulmonary and Critical Care Medicine, Brigham and Women's Hospital, Boston, MA.

Esther E. Dupont-Versteegden recently joined the Department of Geriatrics, Reynolds Center on Aging, Little Rock, AR. Prior to her new position, Dupont-Versteegden was affiliated with the Department of Geriatrics, University of Arkansas Medical Science, VA Hospital, Little Rock, AR.

Claire T. Farley has accepted a position with the Department of Kinesiology and Applied Physiology, University of Colorado-Boulder, Boulder, CO. Prior to her new position, Farley was with the Department of Integrative Biology, University of California, Berkeley, CA.

Associating with the Neural Science Program, Indiana University, Bloomington, IN, **Joshua Michael Gulley** has moved from the Department of Pharmacology, University of Colorado, Health Science Center, Denver, CO.

Accepting a position with the Department of Internal Medicine and Cardiology, Southwestern Medical Center, Dallas, TX, **Thomas James Hawke** has moved from the Department of Human Biology and Nutritional Science, University of Guelph, Guelph, Ontario, Canada.

Appointed to the Department of Surgery, Prince of Wales Hospital, Hong Kong, Peoples Republic of China, **Guo-Wei He** has moved from his position with Cardiothoracic Surgery, University of Hong Kong, Grantham Hospital, Aberdeen, Hong Kong.

Joining the Division of Science and Math, Centre College, Danville, KY, **Daniel Robert Henderson** has moved from the Department of Comparative Bioscience, School of Veterinary Medicine, Madison, WI.

Brent Justin Fong Hill has affiliated with the Department of Biology, Augustana College, Rock Island, IL. Prior to his new position, Hill was with the Department of Physiology, University of Missouri, Columbia, MO.

Accepting a position with the Department of Sports Medicine, Pepperdine University, Malibu, CA, **Jeffrey Lee Jasperse** has moved from the Department of Physiology, University of Virginia, Charlottesville.

After accepting a position with the Department of Georgia Tech/Emory Biomedical Engineering, Emory University, Atlanta, GA, **Hanjoong Jo** moved from the Department of Pathology, University of Alabama at Birmingham.

Following his appointment to the Department of Biomedical Sciences, Cornell University College of Veterinary Medicine, **Michael I. Kotlikoff** moved from the Department of Animal Biology, University of Pennsylvania, Philadelphia, PA.

Romulo Leite has accepted a position with the Federal University of Minas Gerais, Institute of Biological Sciences, Belo Horizonte, Brazil. Prior to his move to Brazil, Leite was associated with the Department of Pharmacology, University of Michigan, Ann Arbor, MI.

Joining the Department of Kinesiology, McMaster University, Hamilton, Ontario, Canada, **Maureen Jane MacDonald** has left the Department of Kinesiology and Physical Education, Wilfrid Laurier University, Waterloo, Ontario, Canada.

Yoshinori Marunaka has accepted a position with the Cellular and Molecular Physiology Department, Kyoto Prefectural University of Medicine, Kyoto, Japan. Prior to his new position, Marunaka was with the Hospital for Sick Children Research Institute Lung Biology, University of Toronto, Ontario, Canada.

Accepting a position with the Department of Exercise and Movement Science, University of Oregon, Eugene, OR, **Christopher T. Minson** has left the Department of Anesthesia Research, Mayo Clinic, Rochester, MN.

Taketoshi Morimoto has become the President of Kobe Women's Junior College, Chuoku Kobe, Japan. Prior to his new position, Morimoto was with the Department of Physiology, Kyoto Prefectural University of Medicine, Kamigyoku, Kyoto, Japan.

Suichi Ono is presently with the Department of Internal Medicine, Ono Medical Clinic, Utsunomiya, Tochigi, Japan. Prior to his new position, Ono was with Jichi Medical School, Kawachi-gun, Tochigi, Japan.

Affiliating with the Department of Stomatology, University of California-San Francisco, San Francisco, CA, **Luanna Kathryn Putney** has moved from the Department of Human Physiology, University of California-Davis, Davis, CA.

Relocating to the Department of Kinesiology, University of Southern California, Los Angeles, CA, **Blake B. Rasmussen** has moved from Metabolism Unit-Shriner's Burn Institute, University of Texas Medical Branch, Galveston, TX.

Accepting a position with the Department of Anesthesiology, Strong Memorial Hospital, Rochester, NY, **Professor James L. Robotham** has

People & Places

moved from the Department of Anesthesia and Intensive Care, Hammersmith Hospital, London, England.

Having joined the Department of Kinesiology, University of Waterloo, Ontario, Canada, **James W.E. Rush** has moved from Department of Veterinary Biomedical Science, University of Missouri at Columbia, Columbia, MO.

John M. Russell has joined the Department of Physiology and Biological Research Laboratory, Syracuse University, Syracuse, NY. Formerly, Russell was associated with the Department of Physiology, MCP Hahnemann University, Philadelphia, PA.

Rita M. Ryan recently affiliated with the Division of Neonatology, Children's Hospital of Buffalo/Kaleida Health, Buffalo, NY. Prior to her new appointment, Ryan was with the Department of Pediatrics and Neonatology, University of Rochester, Rochester, NY.

After associating with the Department of Gynecology & Obstetrics, University of Geneva, Geneva, Switzerland, **Jean-Claude Schellenberg** moved from the Department of Obstetrics and Gynecology, Center of Reproductive Medicine, National Women's Hospital, Auckland, New Zealand.

Chandan K. Sen has accepted a position as Director, DNA Microarray & Genetics Facility with the Laboratory of Molecular Medicine, Ohio State University Medical Center, Columbus, OH. Formerly, Sen was with the Lawrence Berkeley National Laboratory, University of California, Berkeley, CA.

Joining the Department of Medicine as Physician-In-Chief, Sunnybrook and Women's College Health Sciences Center, Toronto, Ontario, Canada, **William J. Sibbald** has moved from the London Health Science Center,

University of Western Ontario, London, Ontario, Canada.

John G. Sikora has joined the Office of Clinical Research, Northwestern University, Chicago, IL. Prior to his new assignment, Sikora was with the Department of Medicine, Nephrology Division, Indianapolis, IN.

Having accepted a position with the Department of Pathology, University of Michigan, Ann Arbor, MI, **Cecilia Louise Speyer** has left the Department of Surgery, Wayne State University, Detroit, MI.

Kerst Stelwagen moved from the Dairy Science Group, Research Station for Cattle, Sheep & Horse Husbandry, Lelystad, Netherlands, to the Department of Food Science, Ag Research, Hamilton, New Zealand.

Lance S. Terada has joined the Dallas Veterans Administration Medical Center, Dallas, TX. Prior to his new position, Terada was with the Department of Medicine, Webb Waring Institute, University of Colorado, Denver, CO.

Accepting a position with the Division of Physiology, Pharmacology and Toxicology, University of Manchester School of Biological Sciences, Manchester, United Kingdom, **Frank Thevenod** has left the Department of Physiology, University of Saarland Medical Faculty, Homburg, Saarland, Germany.

Robert D. Toto has moved from the Department of Internal Medicine, Dallas Nephrology Associates, Dallas, TX, after accepting a position with the Department of Internal Medicine, University of Texas Southwestern Medical Center at Dallas, Dallas, TX.

Bruce D. Uhal has joined the Department of Physiology, Michigan State University, East Lansing, MI. Prior to his new position, Uhal was with

The Cardiovascular Institute, Michael Reese Hospital, Chicago, IL.

Jacques Van Dam has moved from the Department of Medicine and Gastroenterology, Harvard Medical School, Brigham and Women's Hospital, Boston, MA, after accepting a position with Clinical Gastroenterology, Stanford University Medical Center, Palo Alto, CA.

After joining the Department of Environmental Medicine, the University of Rochester School of Medicine and Dentistry, Rochester, NY, **Alice Renee Villalobos** has moved from the Department of Physiology and Neurobiology, University of Connecticut, Storrs, CT.

Accepting a position in the Division of Cardiology, Department of Medicine, Upstate Medical University, Syracuse, NY, **Daniel Villarreal** has moved from the Department of Physiology, University of Missouri Medical Center, Columbia, MO.

Ping Wang recently relocated from the Center for Surgical Research, Brown University and Rhode Island Hospital, Providence, RI, to the Department of Surgery, The University of Alabama at Birmingham, as Professor of Surgery, Physiology, and Pathology.

Louise Wilson has recently accepted a position with Cotton Respiratory Medicine, Airedale Hospital, Steeton, England. Prior to her new position, Wilson was with the Intensive Care Unit, Royal Hospital for Sick Children, Edinburgh, Scotland.

Scott D. Zimmerman has moved from the Department of Medicine, University of California at San Diego, La Jolla, CA, after accepting a position with the Department of Biology, University of Wisconsin, Stout, Menomonie, WI.

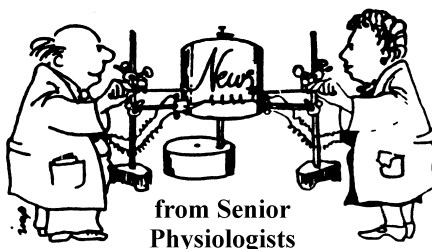
News From Senior Physiologists

Letters to Eugene Renkin

Christian W. Zauner writes: "Effective 1 August 1999 I retired as Dean of the School of Health and Human Performance at East Carolina University in Greenville, North Carolina. Presently I am living with Betty, my spouse of 44 years, in Corvallis, Oregon, in the same home we occupied when I was a department chair (Exercise and Sport Science) at Oregon State University. My daughter, her husband, and our four grandchildren reside in Portland, Oregon, and so retirement location was an easy decision.

"Presently I operate two consulting firms, one dealing with entrepreneurial administration in higher education and the other with design and management of sport and recreational facilities. In addition, I am working with Human Kinetics Publishers (HK) to formulate a database in sports medicine for the new HK web page (eSportMed.com). My wife continues to operate her business, import and sales of Central and Eastern European folk and fine art, and permits me, with trepidation, to assist in that endeavor. I fear that my scientific research is finished since I have no laboratory. The one in which I worked for years, particularly in summers, at Charles University, Prague, The Czech Republic is pretty much out of business due to economic conditions in Czech Academe. This is a shame, since we had some very interesting preliminary data showing a relationship between skeletal muscle fiber distribution and hypertension. My colleagues in Prague are in contact with those at East Carolina and perhaps some way will be found to continue the work.

"Betty and I spend much time with our grandchildren. The three girls are all models. The oldest (11) is a top-notch age group swimmer, the middle one (8) plays soccer, and the youngest (5) is into everything. Our only grandson was born April just past and has no track record of note.



"We are traveling a fair amount. My consulting work takes me off from time to time. We have been to Reno to watch our granddaughter swim in a regional meet. The winter of 1999 found us seeking a bit of sunshine in Puerto Vallarta, Mexico. In a couple of weeks we will be in the Czech Republic where we will visit old friends and colleagues while restocking Betty's business. In October we will travel to Norfolk to visit my oldest son who is in the Navy and stationed there at the moment. While on the East coast we hope to see old friends in Greenville, North Carolina, Gainesville, Florida, and to visit my sisters as well.

"Am short on words of wisdom. Younger colleagues are better trained than ever was I, and find themselves in an academic environment more accepting of exercise physiologists than I experienced most of my professional life. Older colleagues, should they be about to retire, might want to hear that there is no shortage of stuff to do out here, and that you don't have to do the trash you don't like."

George Somjen writes: "Thank you for asking me to contribute to the 'News from Senior Physiologists' column. This is a welcome opportunity to cast a glance backward, as one is supposed to do at our age. At present we are, with my wife, in Amsterdam where I am spending what could be called a post-retirement sabbatical in the institute of Wytse Wadman, dividing my time between the 'wet' laboratory and computer simulations, helped in both endeavors by talented youngsters who do all the hard work. These activities leave evenings free for writing letters, and such.

"To begin at the beginning. Having survived the Holocaust, in 1948 I was lucky to be able to move from my native Hungary to The Netherlands, where I studied medicine at the University of Amsterdam. I started research at the Pharmaco-Therapeutic Institute in the years 1953 to 1956, during the waiting periods between stages of clinical clerkships. My first article appeared in 1955, illustrated with tracings on smoked paper made with a Palmer kymograph. I wonder how many readers of *The Physiologist* today know what that instrument was. In 1956 we moved to New Zealand with my first wife and her two young daughters from a previous marriage. Airplane engines had pistons then, and the journey to Dunedin on the South Island took more than a week, including several stopovers.

"At the University of Otago the chairman of Physiology was Archie McIntyre, from whom I learned neurophysiological techniques, including the then-new intracellular recording from central neurons. The five-man department maintained a respectable research output while teaching 2nd and 3rd year medical, science and dental students, including small discussion groups and a practical course spanning 5 trimesters. Subsequently, in the USA, I never complained about having to teach too much. My two younger daughters were born in New Zealand. They are 'Kiwis' although you can't hear it on their accents anymore.

"At the end of 1962 we traveled on board the Willem Ruys, one of the last passenger liners in regular service, from New Zealand to the USA. Christmas was spent in New York, in those days a safe and welcoming city. All of 1963 and the summer months of 1964 I worked in a fruitful and exciting collaboration with Elwood Henneman at Harvard Medical School in Boston. I was then appointed assistant professor at Duke University by Dan Tosteson, effective January 1964.

"I stayed at Duke ever since, a choice never regretted. I was privileged to do

News From Senior Physiologists

research or to teach for longer or shorter interim periods abroad, with Kresimir Krnjevic at McGill in Montreal, twice with Anthony Taylor at St. Thomas's in London, the University of Ibadan in Nigeria, at Port Moresby in Papua New Guinea, and most recently on several occasions with Wytse Wadman at the Institute of Neurobiology of the University of Amsterdam, from where I am writing this letter. For a while I was running the teaching commission of the International Union of Physiological Sciences, a job that brought many friendships around the globe.

"Working in research is like reading a very slow mystery story. The trouble is, you can never find out how the story ends. In my lifetime the workings of the nuts and bolts of the central nervous system have been, in outline at least, revealed, but we still have no idea how the system as a whole works. One can but wish the best of luck and the best of times to the young generation of neuroscientists trying to solve this greatest of mysteries, and to the generations yet unborn."

Letters to G. Edgar Folk, Jr.

Robert C. Little writes: "Thank you for your kind words on my 80th birthday. My wife, Claire, and I enjoy traveling and have attended at least a dozen Elderhostel programs. We keep busy exercising (both weight lifting and walking), gardening and going to concerts.

"Since my retirement from The Medical College of Georgia my professional activities are largely limited to attending Medical Ground Rounds at the Medical College and serving on the Health Service Committee of the Life Care Community where we live."

Börje E.G. Johansson writes: "Thank you for your kind letter of July 24, 2000. My 70th birthday on July 29 was a nice event that I spent with a well-selected crowd of relatives and friends.

"In response to your request I shall try to sum up the major mile stones of my professional life and my current situation.

"After finishing medical school in Göteborg, Sweden, I joined the group of Professor Björn Folkow in the Physiology Department of Göteborg University and finished my PhD there in 1962. A most important step of my further training in physiology was a year as a research associate with Dr. David Bohr at the University of Michigan in Ann Arbor in 1964-65.

"Back in Sweden I became a professor of physiology at the Medical Faculty of the University of Lund in 1970, continuing my research on the physiology and pharmacology of vascular smooth muscle that was initiated through my work with Dave Bohr. At that time I was also a consultant for AB Hässle in Mölndal, a small but growing pharmaceutical research company belonging to the Astra group.

"In 1980 I decided to leave my academic position and join Astra Hässle as a member of the company's research management team. However, I was fortunate to be able to maintain a part-time association with my group in Lund as an adjunct professor. This continued essentially unchanged till my formal retirement at the age of 65 when the adjunct professorship expired. Over the years I had somewhat varying positions in the Astra Hässle management and was happy to see a remarkable growth of the company both in its cardiovascular and its gastrointestinal sectors.

"During the recent five years I have continued to work part-time as a senior scientific advisor to the preclinical R&D unit of the company and have done so also after the AstraZeneca merger.

"I cannot say that I am doing active research myself anymore, but I am enjoying my life and I try to keep in touch with some of the remarkable developments that occur in physiology nowadays. I use the cardiovascular section of *AJP*, *Circulation Research*, *Science*, and *Nature* to inform me. I may even remember a few percent of what I read last week." ❖

Announcements

Sandler Program for Asthma Research

Last year, the Sandler Program for Asthma Research initiated individual Awards for the support of asthma research. This is to inform you of a second round of Awards for year 2001. The Sandler Program seeks in particular to support excellent bench investigators from outside the field of asthma. This reflects our goal to support innovative approaches to the study of asthma. You are encouraged to apply. The application is streamlined (7 pages total), with a fast turnaround time. Because we seek to attract investigators from outside

the field, we do not require prior studies regarding asthma. We do require excellence, innovation, and relevance to asthma. Applications are due February 15, 2001 for funding July 1, 2001. Two categories of investigators will be sponsored:

Senior Investigators \$250,000/year for three years

Junior Investigators \$125,000/year for three years

For further information, log onto the website: www.sandler-research.org or contact Mee Mee Wong at 415 514-0730. ❖

Online Service to Showcase Tools for Science and Discovery

ALSSA Online—Fall Edition, a free online source for the analytical and life science measurement systems industry's new and latest product introductions, was launched September 12, 2000. This new service can be accessed through the industry association's (ALSSA) web site—<http://www.alssa.org>. It will provide easy and quick access to information on dozens of companies' new products without leaving the office or lab.

ALSSA Online will highlight the latest in instruments, consumables and software for analysis and measurement from leading suppliers like Affymetrix, Agilent, Amersham Pharmacia Biotech, Bruker, Dionex, Invitrogen, Life Technologies, PE Biosystems, PerkinElmer, Promega, QIAGEN, Roche, Sigma-Aldrich, Varian, Waters and many, many more. These products enable science, drug discovery and genetics research, and advance new product development and state of the art production in many industries including phar-

maceuticals, chemicals, food and beverage, biotechnology and semiconductors.

In describing the new program, ALSSA Chairman Jay Flatley said "ALSSA Online provides a significant value to users of our industry's products. ALSSA Online offers one online source of comprehensive and up-to-date information about our newest products and what the leading suppliers are introducing this season. At the same time, attendees at the Fall conferences and product expositions will find ALSSA Online especially useful in organizing their visit."

With headquarters in Alexandria, Virginia, USA, the Analytical and Life Science Systems Association (ALSSA) is the industry trade association for the leading suppliers of instruments and systems including consumables, reagents, and informatics used for analysis and measurement in chemistry applications and the life sciences. For more information, consult their web site at <http://www.alssa.org>. ❖

Wellcome Visiting Professorships in the Basic Medical Sciences 2001-2002

The Federation of American Societies for Experimental Biology invites nominations from US medical schools, universities and other nonprofit scientific research institutions for Burroughs Wellcome Fund Visiting Professorships in the Basic Medical Sciences. BWF encourages institutions to nominate women and members of minority groups that are underrepresented in the sciences. Individuals cannot apply for this program. For application procedures and information, contact Rose P. Grimm, Executive Office, Federation of American Societies for Experimental Biology, 9650 Rockville Pike, Bethesda, MD 20814-3998. Tel: 301-530-7090; fax: 301-530-7049; Email: rg Grimm@faseb.org. Deadline for institutions to apply is **March 1, 2001**. Sponsored by The Burroughs Wellcome Fund. ❖

NIH Minority Mentoring Program

The NIH has long been concerned about the under-representation of minority scientists participating in biomedical and behavioral research. Through its Research Supplements for Underrepresented Minorities Program, investigators with NIH grants may receive research support for underrepresented minorities on their grants. In order to facilitate the use of this program among behavioral and social scientists, the OBSSR has developed a web page that will link underrepresented minority students with potential research mentors (<http://www4.od.nih.gov/research/>) ❖

Announcements

Summer Programs in Japan, Korea, and Taiwan for US Graduate Students in Science and Engineering

Sponsors: National Science Foundation, National Institutes of Health, and US Department of Agriculture

Overview: The Summer Institute in Japan, the Monbusho Summer Program, the Summer Institute in Korea, and the Summer Institute in Taiwan provide graduate students in science and engineering first-hand experience in Japanese, Korean and Taiwan research environments, an introduction to the science and science policy infrastructure of the respective countries, and language and cultural training.

Eligibility: Applicants must be US citizens or permanent residents; be enrolled at a US institution in a science or engineering PhD program, be enrolled in a MD program and have an interest in biomedical research, or be enrolled in and

scheduled to complete at least one full academic year in a master's degree program at the end of the calendar year of application; and pursuing studies in fields of science or engineering that are supported by NSF, NIH or USDA.

Support: International travel costs to and from Japan, Korea or Taiwan; in-country living costs (accommodations, food and professional travel); and an allowance of \$2,500.

Deadline: December 1, 2000

For more information: go to <http://www.nsf.gov/cgi-bin/getpub?nsf99152> or <http://www.twics.com/~nsftokyo/> Direct questions to Thomasina Edwards at NSF; Email: tedwards@nsf.gov; or Tel.: 703-292-8704. ❖

Fifth Biennial International Association of Medical Science Educators July 21-24, 2001—Rochester, Minnesota

This year's meeting will be joint-sponsored and hosted by Mayo Clinic. International speakers will address topics on understanding the process of teaching and learning of basic science throughout the continuum of medical training. Contact: Roger W. Koment, President, IAMSE Administrative Office, 5535 Belfast Place, Suite A, Springfield, VA 22151.; Tel.: 703-333-5223, Fax: 703-333-5224, Email: rkoment@iamse.org, URL: http://www.iamse.org/conf5_menu.htm. ❖

Nobel Centennial Exhibit Seeks Materials

The Smithsonian Museum in Washington and the German Museum in Bonn and Munich are having a joint exhibition in October 2001 in honor of Alfred Nobel's 100th birthday. The focus will be on Nobel prize winners and science. The people developing the exhibit have already interviewed 31 Nobel prize winners in physics, chemistry and medicine and are now trying to find general footage about experimental biology, physics, or chemistry. They want animations about certain experiments or interesting looking videos that could contribute to inspire young people for science in general.

If you have any suggestions for them, please contact the curators: Daniela Creutz, or Neil Hollande; 341 West 24th Street, Suite 20F, New York, NY 10011. Tel 212-675-2527, Fax 212-675-3192; emaildcreutz@earthlink.net ordancreutz@yahoo.com. ❖

Announcements

Gift Planning Opportunities

The American Physiological Society is pleased to invite the membership to consider including the APS in their gift giving plans. Over the last several years, the Society has received donations of land and securities, all of which have been used to launch the Society's various young investigator award programs.

Many options exist if you are interested in including the APS and its Endowment Fund in your financial or estate planning. Some options include:

✿ **Immediate Gifts:** Cash, gifts of appreciated securities, gifts of closely held stock, gifts of tangible personal property, retirement assets, charitable lead trusts and gifts of real estate.

✿ **Life Income Gifts:** Gift annuities, deferred payment gift annuities, charitable remainder trusts, charitable remainder unitrusts, and charitable annuity trusts.

✿ **Gifts of Insurance:** Ownership of life insurance policies can be donated, or the APS can become the beneficiary of policies owned by others.

✿ **Designated Gifts:** Gifts given to honor or memorialize an individual or an organization and can include scholarships, programs, etc., which are specified for support and named for individuals.

✿ **Gifts by Will:** Bequests of a percentage of estate, stated dollar amount or specific property or assets.

For more information on gift giving to the APS, please contact Martin Frank, Executive Director (Tel. 301-530-7118, Email: mfrank@aps.faseb.org), or Robert Price, Director of Finance (Tel. 301-530-7160, Email: rprice@aps.faseb.org).



IUPS Congress Travel Awards Available

The US National Committee for the International Union of Physiological Sciences is seeking **applications for travel awards for the XXXIV IUPS Congress in Christchurch, New Zealand, August 26-31, 2001**. Information and a preliminary program about the Congress are available at <http://www.iups2001.org.nz>.

The Committee will screen the applications, and the awards will be made by The American Physiological Society (APS), which is raising funds for the travel. **The travel awards will be approximately \$1,000 to help cover the majority of the airfare to New Zealand.**

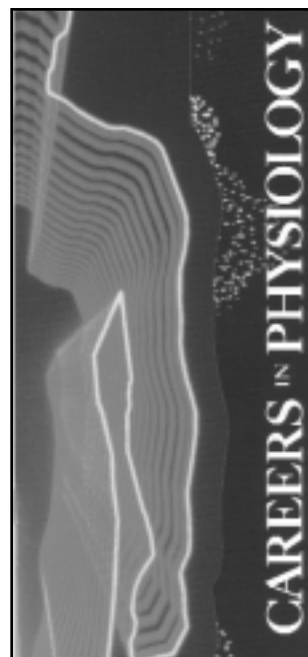
The awards are intended for individuals resident to the United States who have no other source of funds to attend the Congress. Federal employees are eligible. It is anticipated that more applications will be received than can be funded. In addition, APS Council approved funds for a travel award program for APS members who reside outside of the US. For an application, see http://www.the-aps.org/meetings/internat/mtg_iups2001.htm.

The deadline for submissions of applications for travel awards is **January 31, 2001**. **All applicants must submit six copies of the application to USNC/IUPS, National Academy of Sciences, Attn: Paul Turner, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.**

APS Careers Brochure to be Updated

The APS Careers in Physiology brochure is going to be updated in the upcoming year. We would like to include scientific graphics, instruments and result used in physiological research. We would also like to include the career profiles of a few physiologists.

We need your help! If you have attractive artwork samples, or would like to share an interesting story about how you got interested in physiology, please send it in. They may be submitted to APS, Education Office, 9650 Rockville Pike, Bethesda, MD 20814.



Scientific Meetings and Congresses

October 16

Obesity (Institute of Medicine 30th Anniversary Annual Meeting), Washington, DC. *Information:* Donna Duncan, National Academy of Sciences 320, Institute of Medicine, 2101 Constitution Avenue, NW, Washington, DC 20418. Fax: 202-334-1694. Advance registration requested but not required. No fee.

October 22-26

REGPEP 2000: 13th International Symposium on Regulatory Peptides, Cairns, Queensland, Australia. *Information:* ICMS Pty Ltd, 84 Queensbridge Street, Southbank, Victoria, Australia 3006. Tel: +61 3 9682 0244; Fax: +61 3 9682 0288; email: regpep@icms.com.au; Internet: <http://www.icms.com.au/regpep>.

October 23-24

VEGF-Vascular Endothelial Growth Factors—New Discoveries in Regulation and Inhibition, Philadelphia, PA. *Information:* The Knowledge Foundation, Inc., 18 Webster Street, Brookline, MA 02446 USA. Tel: 617-232-7400; Fax: 617-232-9171; email: rfamigli@knowledgefoundation.com; Internet: <http://www.knowledgefoundation.com/vegf2000.html>.

November 4-9

30th Annual Meeting of the Society for Neuroscience, New Orleans, LA. *Information:* Society for Neuroscience, 11 Dupont Circle, NW, Suite 500, Washington, DC 20036. Internet: <http://www.sfn.org>.

November 6-9

Chips to Hits 2000, Philadelphia, PA. *Information:* IBC USA Conferences, Inc., One Research Drive, Suite 400A, PO Box 5195, Westborough, MA 01581-5195. Tel: 508-616-5550; fax: 508-616-5522; email: reg@ibcusa.com; Internet: <http://www.chipstohits.com>.

November 8-11

Jackson Cardiovascular-Renal Meeting 2000, Jackson, MS. *Information:* Meeting Secretariat, Center for Excellence in Cardiovascular-Renal Research, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS 39216-4505. Tel: 601-984-1803; fax 601-984-1817; email: gmcalpin@physiology.umsmed.edu; Internet: <http://cecr.umsmed.edu>.

November 13-14

Functional Genomics: Application of Genomic Technologies to the Understanding of Biological Systems, Boston, MA. *Information:* Cambridge Healthtech Institute,

1037 Chestnut Street, Newton Upper Falls, MA 02464. Tel: 617-630-1300 or 888-999-6288; fax: 617-630-1325; email: chi@healthtech.com; Internet: <http://www.healthtech.com>.

November 15-16

Application of Genomics to Animal Models for Pharmaceutical Studies, Boston, MA. *Information:* Cambridge Healthtech Institute, 1037 Chestnut Street, Newton Upper Falls, MA 02464. Tel: 617-630-1300 or 888-999-6288; fax: 617-630-1325; email: chi@healthtech.com; Internet: <http://www.healthtech.com>.

November 21-25

13th Asian Colloquium in Nephrology and Advanced Course in Nephrology, Bali, Indonesia. *Information:* Secretariat, PO Box 888, JAT 13000, Jakarta, Indonesia. Tel: +62-21 3149208 or 3141203; fax: +62-213155551 or 3152278; email: yagina@commerce.net.id.

November 29-30

Research Informatics 2000: Optimizing and Integrating Informatics for Drug Development, Philadelphia, PA. *Information:* Cambridge Healthtech Institute, 1037 Chestnut Street, Newton Upper Falls, MA 02464. Tel: 617-630-1300 or 888-999-6288; fax: 617-630-1325; email: chi@healthtech.com; Internet: <http://www.healthtech.com>.

December 1

Clinical Informatics, Philadelphia, PA. *Information:* Cambridge Healthtech Institute, 1037 Chestnut Street, Newton Upper Falls, MA 02464. Tel: 617-630-1300 or 888-999-6288; fax: 617-630-1325; email: chi@healthtech.com; Internet: <http://www.healthtech.com>.

December 9

Eleventh Annual Neurology for the Primary Practitioner, Baltimore, MD. *Information:* Conference Coordinator, Johns Hopkins University School of Medicine, Office of Continuing Medical Education, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205-2195. Tel: 410-955-2959; fax: 410-95500807; email: cmenet@jhmi.edu; Internet: <http://www.med.jhu.edu/cme>.

2001

January 3-7

Society for Integrative and Comparative Biology 2001 Annual Meeting, Chicago, IL. *Information:* Society for Integrative and Comparative Biology. Tel: 800-955-1236 or 703-790-1745; fax: 703-790-2672; email: SICB@BurkInc.com; Internet: <http://www.SICB.org>.