

A Publication of The American Physiological Society

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The Sun Breaks Through the Clouds: A Bright Future for Physiology

A Report From the Long-Range Planning Committee

As we are about to enter the twenty-first century, the explosion of information and technology and the changing national priorities and resources make it timely to consider the future of the discipline of physiology and the role of APS in education, research, and outreach to the public.

At the time of the last report of the Long-Range Planning Committee (LRPC) published in 1990 (12), the discipline of physiology was going through a difficult period when its very survival seemed in doubt. That report made several important recommendations. The recommendation for the adoption of "integrative biology" as a definition for physiology has made considerable impact in the scientific community. The recommendation to initiate a superlative series of meetings was accepted by APS Council, and each year since 1992, the Program Committee has organized "APS Conferences," which have been outstanding in quality.

The 1990 report also addressed the relationship between APS and FASEB. At that time, because of the inability of FASEB to attract new member societies to the six-society organization for nearly 50 years, the high member society assessment, and the possibility of losing the American Society for Biochemistry and Molecular Biology (ASBMB), the LRPC recommended

Executive Summarypage 380 Recommendationspage 386 that "APS critically reassess the cost-benefit ratio of continued membership in FASEB at an early time" and that "APS consider...taking leadership in establishing a separate tax-exempt entity." In response to the crisis precipitated by ASBMB and APS, FASEB underwent a fundamental reorganization following its 1989 Williamsburg retreat. FASEB has since focused on public affairs as its primary function and instituted a new dues structure. These changes have led to the recruitment of the American Society of Cell Biology, Biophysical Society, American Association of Anatomists, and the Protein Society, bringing the total membership from six to ten societies in a span of five years. APS played a significant role, in cooperation with other FASEB societies, in making this possible (5). Now FASEB is a widely recognized organization that represents more than 40,000 scientists in experimental biology with major influences on public affairs issues (9).

Since the 1990 LRPC Report, physiology and APS have risen to meet the challenge and grown to be stronger. Today, however, we still face many problems, and we need to continue to amplify our efforts to improve the discipline.

This report does not deal with all aspects of physiology but rather focuses on a few pressing issues facing physiology today, e.g., the roles of physiology as a discipline and as a department in medical schools. Many important areas are not covered in this document, and they will be addressed in subsequent reports.

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Public Affairs

104th Congress Wrap-Up

President Clinton signed an omnibus appropriations bill providing funding for NIH and numerous other agencies on Monday, September 30, at around 10 PM. The action came just hours before the start of a new fiscal year and averted a partial government shutdown that the White House and the Congressional leadership had made clear they would not allow to take place this year.

Although the omnibus appropriations bill was the last piece of "mustpass" legislation, Congress remained in session until Friday, October 4, as the Senate wrapped up its legislative business. Here is a summary of actions with an impact on biomedical research that were taken in the second session of the 104th Congress.

NIH FUNDING LEVEL: NIH got a 6.5% increase for research plus \$90 million for clinical center modernization. Total appropriation: \$12.747 billion, compared with \$11.928 in FY 1996. (See Table 3 on page 403 for an institute-by-institute breakdown on NIH funding.) This was the level of funding APS supported through the FASEB consensus conference and the Ad Hoc Group for Medical Research Funding.

AIDS: NIH is expected to spend \$1.5 billion or more on AIDS and AIDSrelated research in FY 1997. The allocation of the funds will be made by NIH Director Varmus and Office of AIDS Research (OAR) Director William Paul depending upon scientific opportunities and the recommendations of several advisory bodies. This allocation procedure was a compromise between the House, which opposed earmarking for any purpose, and the Senate, which supported designated AIDS funding levels for each institute. The directors of NIH and OAR also have the authority to shift up to 3% of AIDS research funds among institutes and centers during the year.

SBIR: Congress took no action to forestall a rise in the program from 2% to 2.5% of the extramural research budget. NIH has been instructed to hold a conference to discuss ways of improving the quality of the program.

NIH FOUNDATION: \$200,000 in start-up funding was provided for the National Foundation for Biomedical Research, a nongovernmental organization chartered to raise private funds to conduct on NIH's behalf activities that it is unable to carry out on its own.

CAUTION FOR THE FUTURE: The outcome for NIH this year was extremely favorable, but several billion dollars of the money Congress "found" in the closing days of the session to pay for domestic program increases came from one-time sales of government assets. Therefore, it will be difficult next year and thereafter to cover even the ongoing costs of these programs, much less to increase them again.

NIH REAUTHORIZATION: The

NIH Revitalization Act that would have brought about considerable administrative simplification passed the Senate on September 26. Reauthorization is needed periodically for a few programs, even though most NIH programs can be conducted under the permanent authority of the law governing the Public Health Service. Retiring Senate Labor and Human Resources Committee Chairwoman Nancy Kassebaum (R-KS) tried to the use the reauthorization to relieve NIH of its obligations to hold certain advisory committee meetings and to submit certain periodic reports to Congress. Sen. Kassebaum shortened the term of the reauthorization from three years to one year in the hopes of securing support for its last-minute passage. That strategy succeeded in the Senate, where the bill was approved on a voice vote without debate. However, the House declined to consider the legislation, so the bill died when the 104th Congress ended.

HUD-VA FUNDING BILL: On September 26, President Clinton signed into law the VA-HUD-Independent Agencies Funding bill that covers VA Medical Research, NSF, and NASA.

NSF: Research and Related Activities at the NSF was provided with \$2.432 billion in FY 1997, an increase of \$118 million over FY 1996. However, Congress also transferred a \$50 million program to support academic research instrumentation into R&RA and earmarked another \$1.4 million to cover possible tariffs for equipment for the Gemini telescope project, leaving the effective increase only \$56 million or about 2%.

VA MEDICAL AND PROSTHETIC RESEARCH: VA Medical and Prosthetic Research was provided with \$262 million, an increase of \$5 million or about 2% more than in FY 1996.

NASA: Final figures for NASA's small (around \$50 million) competitive research grants in the life sciences are not yet available. However, NASA also asked for and was given the authority to transfer up to \$177 million intended for the development of space station research to cover space station construction cost overruns. There had been reports that these funds would be taken from programs to develop technologies for basic life sciences research on the space station. APS expressed concern about potential disruptions this could cause, and, in providing the requested authority, the VA-HUD conferees said that Congress wanted to review proposed transfers on a case-by-case basis. The conferees also stipulated that the transfers be done so that they would have "no adverse effect on any NASA program."

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Physiology as a Discipline

Integrative Nature of Physiology

The discipline of physiology is integrative in nature and is broad and unifying in its scientific approach. Many physiology departments or their equivalents have added modifiers such as "molecular," "cellular," "integrative," or others (15). Regardless of the name, physiology remains the focus of activity, and all departments are integral components of the physiology community. Physiologists work not only in departments of physiology but also in other basic science and clinical departments in universities and medical schools (13), as well as in industry, government, and other institutions. They all contribute to the advancement of the discipline and play significant roles in shaping its future.

The "integrative" nature of physiology encompasses not only the integration of physiological education and research from molecules to the whole organism but also the interplay of different organ systems in homeostatic regulation and the interaction of physiological activities with other basic science and clinical disciplines. Thus, the integrative nature of physiology is multidimensional.

The State of the Discipline of Physiology

The recent advent of molecular biology has provided new approaches to probe the structural and functional bases of physiological events at the molecular level. Physiologists have increasingly applied these advances to the understanding of physiological function at the cellular, tissue, organ system, and whole organism levels. In a symposium on molecular biology in physiology held in celebration of the centennial of APS, it was noted that "The modern technologies of molecular biology have made it relatively easy to clone a gene of interest, but it is often difficult to determine its function. While the application of molecular biological techniques will help to open new horizons for physiological research, molecular biology is in search of problems to be solved, especially those of physiological relevance....If we can take advantage of the marvelous technologies developed in molecular biology, we will not only make significant advances in physiology per se, but also place physiology at the center stage in this new era of development in biomedical sciences" (4).

At his 1996 APS Physiology InFocus lecture Francis Collins, Director of the National Center for Human Genome Research at NIH, stated, "It is rapidly becoming evident to the world community of molecular biologists and geneticists involved in mapping and sequencing of genes that the next important phase of scientific development must be directed toward understanding the functional expression of these genes and the study of the physiological systems under the control of these newly discovered nucleotide sequences (genes). The functional relevance of many of these genes will have to be studied in a variety of experimental animal models in order to understand their function and their relevance in both normal and pathological states" (6).

At the current stage of development of molecular biology and genetics, the importance of physiology has been pointed out by many others. For example, Claude Lenfant, Director of the National Heart, Lung, and Blood Institute at the NIH, said, "The great potential of the new technologies is so fascinating, so innovative, and, yes, so glamorous that it is impossible to overlook....Nevertheless, the determinism of genetics, for example, has its limits....The full realization of the implications of this new knowledge will not occur without the concurrent and inspired efforts of scientists who apply this information to the large organism and use it in the context of the vast knowledge already assembled about living creatures" (11).

Physiologists today have an unprecedented opportunity and face the great challenge of integrating the rapidly developing knowledge at the molecular, cellular, tissue, and organ levels to achieve a comprehensive understanding of bodily functions in health and disease. As stated by Stanley Schultz in his Claude Bernard Distinguished Lecture, "While knowledge of the parts is necessary, it is by no means sufficient. We must also know the rules of association or integration. Deciphering these rules will be the next breathtaking revolution in biology" (16). In recent years, APS has been proactive in fostering the integration of the conceptual revolutions in molecular and cellular biology with an understanding of the interplay of cells, tissues, and organs (7, 14). The Human Genome Project, which forms the focus for a collective effort by a large number of researchers, is moving our understanding of biology onto a new plane and provides unique opportunities for the study of physiological functions that are determined by genes and gene segments (See "Research," p. 385). Physiologists can stand at the forefront of biomedical sciences by providing the techniques needed for these efforts.

Recruitment of Young Scientists

For a discipline to be vibrant, there needs to be a continued infusion of new blood. Therefore, the attraction of bright young investigators into the discipline of physiology and APS is a task of great importance. The age distribution of APS members has remained relatively constant. As the total membership increased from 6,761 in 1987 to 7,722 in 1996, there was an increase in the number in every age group (by decade). It is gratifying to note that the greatest relative increase is in the group 20-29 years old, rising from 52 in 1987 to 289 in 1996. Part of this is due to an increase in student members. In order to continue to attract young members, APS needs to

enlist the help of its members and to enhance communications with the rest of the scientific world through scientific meetings, journals, and other activities (See "Roles of APS," p. 385). The continuous inflow of a stream of talented young scientists needs to originate at a rather early age. Therefore, we should foster the introduction of physiological concepts in the education of undergraduates (See "Undergraduate Education," p. 383) and even primary and secondary school students (See "Education," p. 385).

There are many outstanding young scientists working at the forefront of physiology with excellent abilities to integrate molecular and cellular biology with organ system functions. APS should aggressively recruit such scientists to help the Society with its activities, such as publications and programming of meetings.

Physiology Education

Education in Medical Schools

The Importance of Physiology in Medical Education. Physiology plays a fundamental role in medical education. The maintenance and/or restoration of homeostasis is the goal of medicine. The teaching of physiology to medical students provides an essential foundation for their medical education and future professional practice. A survey of North American medical schools (82% participation), including faculty from the basic science and clinical departments, identified a primary set of 27 biomedical concepts that are important to the practice of medicine (8). Seventeen of these 27 key concepts are derived principally from physiology; furthermore, in the ranked order of topics by relevance to the practice of medicine, 11 of the top 14 concepts are taught in medical physiology courses. This comprehensive analysis documents the importance of basic science teaching and demonstrates the essential role of physiology in the training of physicians.

The Place of Physiology Departments in the Medical School Curriculum. The successful education of many generations of medical graduates has been achieved by teaching physiology and other basic sciences through identified courses organized by discrete departments. The mastery of the fundamental principles of each discipline, which is a prerequisite for interdisciplinary integration, requires a rigorous period of concentration and study in a structured course offered by a department. Such curricular organization gives each discipline specific educational goals and each department the responsibilities and flexibility to structure the curriculum and to uphold the standard of the discipline. The size of the faculty in a department and the faculty's sense of belonging to an identifiable unit are critical for the organization of a successful course. Physiology, as well as other basic sciences, is most effectively taught and learned within courses devoted to the discipline.

Successful teaching of basic medical sciences requires the interaction and correlation among the various courses, as well as between these courses and clinical teaching. With the increase in time demand for medical school faculty to obtain research funding and the general lack of emphasis on teaching in the appointments and promotions process, there has been a tendency towards decreased commitment of basic science faculty to the coordinated planning of course coverage. This tendency has led to less than optimal use of educational opportunities. Teaching of basic sciences as an interdisciplinary course has been implemented in several medical schools. Correlation among disciplines cannot be achieved by simply merging the schedules of several departments. What is needed is greater interaction among faculty, not only within a given department but also between departments. When cooperation among department-based courses is accomplished, we have the best of both worlds: a coordinated physiology course taught by the concerted efforts of dedicated departmental faculty that is closely related to other courses by careful planning.

The Teachers of Physiology. Physiology faculty should bear the primary responsibility for teaching courses in physiology, and it is essential that the faculty retain a strong and enthusiastic commitment to this important mission. While it may be desirable to have active investigators teaching their areas of expertise, the research interests of members of a given department usually cannot cover all areas of physiology; hence, some will have to teach in areas outside of their research expertise. Many physiological principles are shared by different organ systems and provide common threads for understanding the mechanisms of function. With adequate preparation, physiology faculty should be able to teach many different areas in the discipline. Although this accommodation may not bring the most profound sophistication to all subject areas, dedicated nonspecialists often can be as effective as experts in teaching a given subject, because the nonexperts are likely to approach the topic from a broader perspective (18). The organization of a physiology course by a core group in a department of physiology or its equivalent provides the quality control, unified sense of purpose, and coordinated teaching that are essential to educational success.

In order to present the best possible course, it may be desirable to use the talents and expertise of faculty who hold primary appointments in other departments. Physiologists in clinical departments often are a valuable teaching resource. It is worth noting that in 1994 only 37% of medical school faculty holding physiology degrees were in departments of physiology, whereas 45% were in clinical departments (13).

Executive Summary

This report does not cover all aspects of physiology and only focuses on several issues facing physiology today, e.g., the roles of physiology as a discipline and as a department in medical schools. Other areas will be addressed in future reports.

Physiology as a Discipline

- Physiology is in a healthy state that is being steadily strengthened by incorporating advances in molecular biology and genetics.
- The integrative nature of physiology is multi-dimensional, including organizational hierarchies and interplays among body systems. The preservation of departments of physiology is essential for the development and enhancement of the discipline. Some departments of physiology and divisions of physiology within larger organizational units have adopted a variety of names, but they all are integral components within the physiology community.
- The continuing vitality of physiology depends on the recruitment of talented young scientists. This goal can best be accomplished by fostering and publicizing the very best, cutting-edge science published in the Society's journals and presented at its meetings.

Physiology Education

- The maintenance and restoration of normal physiology is the goal of medicine, and a working knowledge of physiology is fundamental to medical education.
- Physiology and other basic sciences incorporate distinctive sets of principles and attributes. Retention of these discipline-specific principles is essential for assuring the richness of a scientific medical education. This aim can be achieved optimally with department-based teaching and with close cooperation among different courses. When courses are organized along interdepartmental/interdisciplinary lines, it is important to preserve the conceptualization in each discipline.
- The teaching of each component in a physiology course should emphasize principles and span the range from molecules to the organism. All members of the teaching faculty should develop an appreciation for the integrative nature of physiology, including molecular and cellular biology, as well as systems physiology.
- Physiology is health, and pathophysiological derangements are the basis for understanding disease. Pathophysiology should be introduced into medical physiology courses where appropriate. Teaching of physiology by physiologists should be a part of the curriculum in the clinical years of medical education.
- Graduate education in physiology should emphasize principles, control mechanisms, and integration and minimize the memorization of facts. With limited resources for career positions and research funding, consideration should be given to the supply/demand relationship. Doctoral candidates must meet appropriately high standards for admission. Master's programs with clearly established goals may provide cost-effective training for technical and managerial personnel for academic and industrial research laboratories, government, and other organizations.

Executive Summary (continued)

• The importance of physiology in health and disease should be made clear to our Congressional representatives and to the public. Teaching of physiology to college undergraduates and primary/secondary school students serves the dual purpose of educating a decision-making public and attracting new talents into the field.

Physiological Research

- Further incorporation of molecular and cellular biological approaches into physiological investigations is essential to the continued progress of integrative efforts and should be encouraged. Physiology is the discipline that is well suited to decipher the functional consequences of genetic modifications in whole animals as well as in cell systems. Fellowship programs that combine molecular and genetic approaches with whole animal studies should be fostered.
- Progress in our understanding of disease and our ability to prevent, treat, and cure disease is dependent upon advances in basic and clinical research. Efforts should continue to enhance funding for biomedical research from NIH and other agencies. Investigator-initiated projects, rather than targeted and goal-directed funding, are the most cost-effective mechanisms to generate research findings that will lead to valuable clinical application.
- Physiologists who appreciate the significance of integrative biological research should participate actively as regular members of NIH study sections and peer-review boards of other agencies.

Departments of Physiology

- The teaching of medical and graduate students is carried out most effectively by discrete departments of physiology or their equivalents in medical schools.
- Faculty in departments of physiology should have breadth in teaching but focus in research.

Roles of APS

- APS should foster the incorporation of molecular biology and genetics into physiology by sponsoring teaching tutorials and fellowship programs.
- In order to recruit the best young scientists and students into APS and to enhance the involvement of current members, APS meetings and journals must highlight the very best and latest science.
- APS should continue to strive for excellence in its journals and should move aggressively into on-line publication.
- APS, in concert with FASEB and other organizations, should be a facilitator and an advocate in public forums to emphasize the importance of integrative biomedical research and education at all levels.
- APS should foster the formation of regional chapters and local meetings and should encourage communications between the chapters and Council. These activities will serve to enhance participation of APS members in Society affairs.

The involvement of faculty from distant institutions in the teaching of physiology courses should be discouraged because such faculty would not be available for the planning and coordination of the curriculum, nor for consultation by students throughout the duration of the course.

In recent years, many new faculty members recruited to departments of physiology have been educated mainly in molecular and cellular biology with little or no training in organ system physiology. Efforts should be made by physiology departments and APS to help such new members to feel at ease teaching physiology with an integrative approach that spans the range from molecules to the whole organism. At the same time, faculty trained only in organ system physiology should receive training to become conversant in the molecular and cellular fields and include these aspects in their teaching.

Coverage in a Medical Physiology Course. An important issue to consider is: "How much of the information explosion in basic research is appropriate (and necessary) for a medical education?" We must take a very careful look at how much detail is necessary and must objectively separate personal research interest from the overall goal of the educational process. The emphasis of physiology courses should be on principles rather than on details.

In a recent extensive report by the Association of American Medical Colleges (AAMC) on educating medical students, it was recommended that the first educational goal of faculty at medical schools should be to foster their students' lifelong learning by helping them develop self-directed learning skills (1). The LRPC affirms the laudable goals advocated by AAMC and emphasizes that achieving more active student learning does not require dismantling a department-based course. Rather, sound educational objectives can be incorporated easily into a department-based course that includes several formats for faculty/student interaction.

Many schools have moved toward facilitating more active learning by incorporating various teaching modalities into the course in physiology. Examples are problem-based learning exercises, computer interactive programs, and other small group activities, all of which are often based on clinical histories, diagnosis, and treatment and are led by physiologists and clinicians. These modes of teaching are effective in reinforcing the clinical relevance of physiology and in sparking the interest of the students. However, such approaches should complement rather than replace the teaching of principles because it is a background in fundamentals that will allow future physicians to handle complicated clinical situations.

The medical physiology course is the ideal setting for students to understand the complex, interactive nature of the human organism. Within the course, the mechanisms and interactions of control systems from the molecular to the systemic should be emphasized. **Interaction of Physiology with Clinical Disciplines.** It is not by accident that the bridge between the basic sciences and clinical problems is called pathophysiology, nor that the Nobel Prize in biomedical sciences is given "for Physiology or Medicine." Discussions on pathophysiology and appropriate clinical material in medical physiology courses draws the attention of students (17). Teachers of physiology will do so with greater ease and accuracy if they have some familiarity with clinical medicine. Consequently, they should be encouraged to attend relevant clinical conferences. This reasoning applies especially to those teaching pathophysiology, which epitomizes the interaction of physiology with clinical disciplines. By a similar token, physiologists should present grand rounds or seminars at clinical departments whenever possible.

Extending some teaching of physiology into the clinical years of the medical curriculum would strengthen the role of physiology in medical education. Experience shows that if such offerings are limited to elective courses during the final two years of medical school, few students will avail themselves of the opportunity. It is desirable to give short refresher courses that illustrate the relevance of physiology to clinical endeavors as a part of the required curriculum during the clinical years. In the August 1995 issue of The Physiologist, Bruce Koeppen, the third annual Arthur C. Guyton Physiology Teacher of the Year Awardee, said, "As physiologists, the teaching we do should not end when the first or second year physiology course is over. We should insist on having time in the clinical years to revisit and amplify the basic physiological principles that are so important for understanding the pathophysiology of disease" (10). The LRPC strongly endorses this position.

Graduate Education

Purpose of Graduate Education in Physiology. The main purpose of graduate education is to prepare the students for productive careers in physiology. Therefore, the design of a student's course of study should take into consideration the anticipated directions of physiological disciplines in relation to career opportunities in academia, industry, and other organizations.

Areas of Coverage. Graduate education in physiology can include a variety of subject areas and disciplines that are tailored by individual graduate programs throughout the country. It is essential, however, that all physiology programs should have a common element, i.e., the development of an understanding of physiology as an integrative science with at least one formal course in organ system physiology, as well as molecular biology and cell biology. Another important area in graduate education is pathophysiology, which provides the information for understanding the mechanisms of disease —

an indispensable body of knowledge in the future career of graduate students as faculty in medical schools and as scientists in industry.

Duration of Training. The length of graduate training should be optimized for the benefit of the student, but should not be excessive. In general, a duration of no more than five years from entrance into the program to award of the PhD degree is recommended.

Supply/Demand Relationship for PhD Graduates. Careers in physiology are and will be very competitive. The availability of faculty positions and research funding is not increasing. As the competition for limited resources intensifies, the level of talent, preparation, aptitude, and desire required for success will rise. Only the most highly qualified and motivated students can have favorable expectations for success in physiology. Therefore, admission to graduate programs should be limited to the students who have the intellectual and motivational qualities required to complete the program and who are well informed about physiology as a discipline and as a career choice. Graduate students should receive broader training to develop skills that translate into many different career tracks, e.g., in industry, government, and other appropriate organizations in addition to academic positions.

A database needs be developed on the supply/demand relationships for PhD graduates, including past records, current status, and future projections for not only academia but also industry and other career opportunities. This information can help to determine the optimal number of students to be trained. The LRPC strongly supports the efforts taken by AAMC in this regard. A recent AAMC survey found 1,811 physiology faculty positions in 1994 with 55 openings (1, 13). It is not known what number of positions are available in other medical school departments, in nonmedical universities and colleges, and in industry. There are approximately 1,400 graduate students in physiology departments with 200 receiving degrees annually (13). In these departments, there are approximately 800 postdoctoral fellows (25-50% are nonresidents, and some may return to their home countries), and it may be estimated that approximately 150 physiologists will seek fulltime professional positions each year. Additional data are needed to assess the supply/demand relationship.

Master's Program in Physiology. It is highly desirable to develop self-standing master's training programs explicitly focused on the master's level, with clearly established goals and not a fall back from the PhD program. Such a program may provide the professional and technical personnel needed in pharmaceutical and biotechnological industries, governmental agencies, university research teams, and teachers in primary and secondary schools. In many cases, a well-trained

master's student may be more desirable to the employer and prove to be more cost-effective in graduate training. Cooperative master's training with other fields, e.g., business, education, etc., would provide the student with a broader perspective and a more marketable background.

Undergraduate Education

In contrast to other biological disciplines such as biochemistry and microbiology, there are relatively few universities that provide physiology courses at the undergraduate level. As a result, many undergraduates are never exposed to physiology as a discipline. However, there is a real need for undergraduate physiology courses; in fact, one might argue convincingly that a general introduction to human physiology should be a required component of all undergraduate degree programs. In schools that do not already have established undergraduate programs in physiology, it would be desirable for the physiologists from medical school departments to consider developing appropriate course offerings that can attract students from all programs.

Through exposure to physiology, undergraduates will better understand how their bodies function, and they may be motivated to do advanced work in physiology. Another important benefit of this effort might be that the field of physiology would be better appreciated by the general public, since a much larger proportion of families is aware of — and influenced by — undergraduate rather than by graduate education. Thus, not only the undergraduate students themselves but also their families may become better informed as citizens who have to make decisions on biomedical issues, including federal and state support of research and training.

Physiological Research

Impact of Molecular Biology and Genetics on Physiological Research

The availability of molecular and cellular techniques has injected new excitement into biomedical research. These powerful new tools are being incorporated increasingly into physiological investigations in order to address fundamental physiological questions. The trend is evident in the papers published in the *American Journal of Physiology* and other physiology journals and in the presentations at meetings organized by APS. For example, out of some 30 APS symposia held each year, only three symposia in the five-year period 1982-1986 had the word "molecular" or "genetic" in the title. This number rose to 16 in 1987-1991 and to 26 in 1992-1996. When the titles of the individual papers and the content of the symposia are examined, the incorporation of advances in molecular biology and genetics is even more

striking. Furthermore, most of the symposia held in 1996 are integrative in nature covering the whole spectrum of physiology, including the molecular/genetic aspects. Similar trends can be seen in the Cannon Lecture, the Bowditch Lecture, and the Section Distinguished Lectureships started in 1994, as well as in the free communications. APS Conferences have been organized to foster the integrative nature of physiological investigations and to cover the whole spectrum. The pendulum has already swung from a situation where the discipline of physiology seemed to be threatened to one in which physiology is incorporating moleculargenetic advances and regaining recognition as an essential component of biomedical efforts.

Genetically modified animals provide an excellent example for studying the physiological consequences of specific molecular mutations in the whole animal. Such studies require a synergy between physiologists and molecular biologists, which can be realized only after scientists in each discipline have a sufficient understanding of the other, with both having the common goal of elucidating the mechanisms of physiological functions at the molecular level. The APS Postdoctoral Fellowship Program in Mammalian Organ System Physiology, which combines molecular and genetic approaches with whole animal studies in the same research projects, is a specific effort to meet the need. Such programs should be amplified by the participation of other scientific organizations, educational institutions, and funding agencies.

Relation of Physiological Research to Clinical Investigation

Physiology should play an important role in interfacing clinical investigations and basic sciences. The elucidation of pathophysiological mechanisms of disease is a major component of clinical research. The classically trained physiologist with a knowledge of molecular biology can play a critical role in a research team that includes clinical investigators and molecular biologists. By bridging basic life sciences to clinical medicine, physiology can contribute importantly to our health and well-being. From this point of view, physiology is health.

Funding of Physiological Research

One of the main driving forces for career choices in basic science is funding. Most of the support for physiological research comes from NIH by way of study section review of investigator-initiated applications. It is necessary to include physiologists who appreciate the significance of integrated biological research as regular members of these study sections. The physiology community should express this view to the funding agencies, and individual physiologists should serve when asked.

In this climate of budgetary constraint, federal funding of biomedical research, including physiological investigations, has become increasingly stringent during this decade. Most institutes in NIH have been funding at levels less than the 15th percentile. Thus, many excellent proposals submitted by well-established or young investigators are not funded, resulting in numerous missed opportunities for innovative discovery and discouragement for many investigators. Physiological and other basic research forms the foundation of the understanding of mechanisms of disease and provides the knowledge for improvement in the diagnosis, treatment, and prevention of ailments. We need to inform our congressional representatives of the importance of our research activities to the health of our citizens, the productivity of our industries, and our economic competitiveness in the world. We should also raise the awareness of the general public and generate greater support from the private sector. The public affairs offices of APS and FASEB, as well as other organizations, are working effectively on research funding (See "Research," p. 385). The general support of the membership through letter writing and visits to their Congressional representatives is essential to the success of efforts to sustain and enhance funding of biomedical research.

History shows that important scientific insights and major medical advances have resulted from basic research that was not targeted at any specific disease. Therefore, investigator-initiated research projects are the most cost-effective mechanisms to generate findings that will lead to valuable clinical application.

Departments of Physiology

The Importance of Departments of Physiology

The teaching of medical and graduate students and the conduct of basic and medical research will continue to be an important function of departments of physiology. As discussed in "The Place of Physiology Departments in the Medical School Curriculum," these functions are carried out most effectively by discrete departments of physiology in medical schools. The continuance of separate departments has been challenged in some medical schools to the point where some departments of physiology were abolished or amalgamated with other basic science departments. As already stated (See "The Place of Physiology Departments in the Medical School Curriculum," p. 379), such amalgamations compromise the effective teaching of medical students and the scientific foundation of clinical medicine. In some schools, this practice was later regretted, and independent departments were reinstated. APS should make a strong recommendation to the Liaison Council for Medical Education for the continuance of discrete departments of physiology.

Faculty of Physiology

Departments of physiology should avoid the temptation to "cover the waterfront" by recruiting their faculty to conduct research in every area that is being taught. Rather, a focused set of research strengths helps a department to achieve recognition and maintain competitiveness. As mentioned previously (See "The Teachers of Physiology," p. 379), nonspecialists often teach a given topic as effectively as do those specializing in the field. Thus, a useful motto for a department might be: "Breadth in teaching but focus in research."

With the advent of molecular biology, the boundaries between different body systems are becoming increasingly vague. Physiologists working on different systems may use the same experimental techniques and approaches. Furthermore, increasing numbers of genes and their proteins once thought to be unique to a particular type of organ or cell are found to play important roles in other organs and cells. Therefore, the techniques of molecular and cellular biology, far from being just reductionistic, can be unifying and integrative. In that sense, we are entering an exciting era in which faculty in departments of physiology have much more in common with one another than before.

Time Demands

Departments of physiology and their faculty face increasing demands on their already crowded schedules. One serious problem is the inordinate amount of time required for writing grant applications, leaving little time to do the research itself. APS should work with granting institutions to introduce changes that might alleviate this problem. Another problem is in the expansion of teaching loads. In this report, for example, we advocate the participation of medical school physiology faculty in the teaching of undergraduate courses (See "Undergraduate Education," p. 383). We might reduce the extra time required for this desired step by establishing archives of teaching resources, which can decrease the redundancy inherent in the redevelopment of courses by every new instructor.

Roles of APS

Education

Vander (18) lauds the expanding role of APS in supporting the teaching of physiology, an effort that began in the 1950s and has continued to increase. One specific avenue that could be developed further is to enhance the utilization of the *Advances in Physiology Education* journal of the Society. The Wide Web, thus increasing accessibility to ideas and potentially the number of published peer-reviewed articles on education without substantially increasing publication costs. The function of this journal could include the electronic publication of well-designed lectures for physiology courses with animations and illustrations. This could provide an interesting new avenue for documenting and recognizing professional teaching contributions as formal publications in a manner analogous to that now existing for research publications. Such a venue would address two goals: to create a mechanism for documenting peer-reviewed teaching contributions (conceivably useful in the tenure and promotion process), and to provide the on-line teaching resources advocated in this report in support of expanding teaching roles for physiology faculty.

Society should consider publishing this journal on the World

In our efforts to recruit future physiologists, we should extend our educational efforts into primary and secondary schools. Ongoing APS activities could use a web site to provide workshops for teachers, generate archives of on-line teaching aids for classroom presentations, and provide simple but effective laboratory experiences for primary/secondary school students.

Research

In view of the increasing need to understand the physiological implications of new discoveries in molecular biology and genetics, including those made in the Human Genome Project (See "Recruitment of Young Scientists," p. 378), it is important that APS play a major role in fostering such research. We should provide academic leadership by applying physiological techniques and knowledge, utilizing integrative approaches, and enhancing collaborations with molecular geneticists, including the development of interactions with societies concerned with molecular genetics, to pursue this cutting edge research.

APS, in concert with FASEB and other organizations, is actively involved with federal legislation and regulations that affect physiological research, and Society officers and members often testify before Congress on relevant policy issues. Through its advocacy effort, the Society plays a significant role in shaping federal policy on NIH funding and the use of animals in research. The success of APS in the area of public affairs is highly dependent on the participation of APS members via communication with their elected representatives. An e-mail-based system called APS NetAlert has recently been developed for the timely distribution of information on public affairs issues so that members can write to request congressional action. All APS members are encouraged to become involved in this important initiative.

Recommendations

Concerning education, the LRPC recommends that:

- Physiology in medical schools be taught as a course organized by the department of physiology or its equivalent and that the teaching of each topic in the course be closely coordinated with all related courses.
- PhD education emphasize the integrative nature of physiology and prepare students for a variety of productive careers in physiology. The duration of PhD training generally be no more than five years, and the supply/demand relationship be evaluated.
- Self-standing programs leading to a master's degree in physiology be encouraged in order to meet the needs for technical and managerial careers in physiology outside of academia.
- Faculty of departments of physiology in medical schools be encouraged to take an interest in teaching at the undergraduate and primary/secondary school levels.

Concerning research, the LRPC recommends that:

- Every effort be made to enhance the use of an integrative approach, including molecular-cellular and organ system studies, to elucidate fundamental physiological mechanisms.
- Physiological research take advantage of its unique strategic position at the interface between basic sciences and clinical medicine and address pathophysiological questions that bridge these disciplines.
- Physiologists participate actively in peer review groups of granting agencies to assist in elucidating the significance of molecular and cellular findings in whole animal function, and to assure the equitable support of meritorious projects using an integrative approach.

Concerning the roles of APS, the LRPC recommends that:

- APS continue to enhance its support for physiology education through its meetings, publications, and awards, pursue the application of new information transfer technology to advance physiology teaching, and cooperate with other organizations to develop a data base on the supply/demand relationships for PhD and MS graduates.
- APS continue to present only the highest quality and most invigorated science through its meetings and publications and to implement innovative inputs from the sections, affiliated chapters, and members at large.
- APS develop programs to address novel issues of science arising from the Human Genome Project, make immediate plans to establish collaborative relationships with American societies concerned with molecular genetics, and encourage these societies to become a part of FASEB.
- APS continue to work with FASEB on public affairs issues and to amplify its grass roots efforts through regional networking of Society members.
- APS make a strong recommendation to the Liaison Council for Medical Education for the continuance of discrete departments of physiology.
- APS project clearly to its membership and to the outside world the impressive advances, distinct vision, and bright future of the Society and of the discipline of physiology.

Meetings

We should continue to enhance our efforts to sponsor the very best and most current science at our various meetings, be they Experimental Biology, APS Conferences, or Intersociety Meetings. In order to support excellence in medical school teaching, APS should continue to sponsor and expand refresher courses, workshops, and satellite meetings related to teaching as at Experimental Biology meetings. The sessions should include not only basic physiology but also clinical overviews for basic scientists.

While APS sections and special interest groups have been very effective in increasing participation of the membership to ensure scientific excellence of the meeting programs, it is also important for these groups to work together to accomplish interdisciplinary goals in programming. The Physiology InFocus program of Experimental Biology meetings has been successful and should be continued and enhanced. Our meetings must incorporate astute and timely programming, and they should be publicized in the scientific and lay media through professional public relations activity. In order to attract the very best scientists, we should support speakers at our meetings with APS funds, whether or not they are members of our Society. When the participants see through our meetings that we welcome all disciplines relevant to physiology and vice versa, then they will be attracted to join our Society.

Publications

We should continue our practice of having the best talents serve on our editorial boards, whether or not they belong to APS. At the same time, we should strongly and continuously urge nonmembers on editorial boards to join our Society. In order to remain at the forefront of media advancements, our journals must move aggressively into the field of on-line publication. Societies that initiate these steps early will take the leadership in scientific publication. The younger generation that we wish to attract is attuned to such modern means of communication, and they will welcome such innovative approaches.

Participation in Society Governance

APS committees, sections, special interest groups, and regional chapters offer a variety of opportunities for members to be involved in Society activities and to work together to mold the future. Since APS has only a limited number of committees and positions, it is not possible for all who wish to serve to do so. Considerations should be given to increase the size of some committees in order to involve interested individuals in Society affairs. Another solution to this problem is to encourage the formation of regional chapters. Such chapters will provide networks for members to communicate with each other on issues of common interest, including research, teaching, public affairs, etc. These regional chapters should have a mechanism for effective communication with APS Council so that the Society can reach the grass roots level and vice versa. Only Ohio and Iowa currently hold official chapter status. Interested members should be encouraged to form additional regional chapters.

Recruitment of Students

Teaching courses in physiology at the undergraduate level (See "Undergraduate Education," p. 383) is probably an effective means to attract additional student members. The Society's current practice of offering initial free membership to graduate students should be continued.

Perspectives

Physiology as a discipline and APS have come a long way since the last LRPC Report. Physiology is undergoing dynamic changes, and we should focus on integrating biological research from molecules to the whole organism. We should also incorporate this type of approach in our education of medical and graduate students. APS should take the initiative to provide continuing education for physiology faculty who need this type of expertise, so that they can adopt the integrative approach in their research and education. In physiology, we study the maintenance of homeostasis in adaptation to changing environments and functional demands. Physiology as a discipline has been encountering rapidly changing environments and demands. The future of physiology depends on whether it can undergo structural and functional adaptations in the face of these dynamic changes while maintaining its fundamental mission in research and education. The indications are that we have successfully passed the most difficult period and that we need to continue to adapt ourselves such that physiology will come out better and stronger than ever. In order to succeed, we must set our vision high and far, and we must implement our plans with action. Our vision and our action will assure a bright future for physiology as we enter the twenty-first century.

APS Long-Range Planning Committee, 1996

Shu Chien (Chair), Alan Cherrington, John S. Cook, Patricia Metting, Herschel Raff, Heinz Valtin, David B. Young, and Andrea Yool

(With the participation of Frank Belloni, Walter Boron, Allen Cowley, Brian Duling, Martin Frank, and Aviad Haramati)

The title "The Sun Breaks Through the Clouds" was modified from Shakespeare, *The Taming of the Shrew*, IV, iii, 173.

We wish to thank the Executive Office, the Education Office, and the Membership Office of the American Physiological Society for their valuable help in the preparation of this report.

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MAMMALIAN ORGAN SYSTEM PHYSIOLOGY POSTDOCIORAL FELLOWSHIP



SPONSORED BY THE AMERICAN PHYSIOLOGICAL SOCIETY

CRITERIA:

- Project must use the tools of cellular and molecular biology in the setting of the whole animal.
- Identify a laboratory and sponsor under whose supervision a project in mammalian organ system physiology and molecular biology can be combined.

AWARD

- Two year annual stipend of \$30,000
- Trainee allowance of \$3,500

CONTACT:

APS Postdoctoral Program The American Physiological Society 9650 Rockville Pike Bethesda, MD 20814-3991 TEL: (301)530-7118 FAX: (301)571-8305 info@aps.faseb.org

DEADLINE: January 15, 1997

This program has been designed to promote careers in mammalian organ system physiology.

1996 APS Intersociety Meeting The Integrative Biology of Exercise October 16–19, 1996 • Vancouver, British Columbia

Vancouver Harbor served as the backdrop for the Society's second Intersociety meeting on The Integrative Biology of Exercise. Organized by Peter D. Wagner with the assistance of an organizing committee consisting of Arend Bonen, Frank Booth, James H. Jones, Harold Laughlin, Ethan R. Nadel, Ronald Terjung, Tony Waldrop, and David Wasserman, the meeting was designed to develop an understanding of the scientific basis of exercise, which crossed interdisciplinary boundaries. Specifically, the symposia were designed to offer integration on several fronts: from molecular to whole organism function, from health to dis-



A view of Vancouver Harbor.

ease, from biochemical to biophysical processes, across species, and between organs.

The meeting featured an outstanding program focusing on all aspects of exercise physiology that drew upon the expertise of APS, American College of Sports Medicine (ASCM), and Canadian Society for Exercise Physiology (CSEP). It attracted 699 registrants with 35% of the attendees being APS, ASCM, or CSEP members. Thirty-two percent of the registrants were students, and 12% were postdoctoral fellows (Table 1).

Table 1. Registration Statistics

Type of Registrant	Number
Member (APS/ASCM/CSEP)	243
Nonmember	52
Postdoctoral	83
Student	228
Retired	1
Guest of Registrant	12
Invited Speaker	68
Exhibitors (6 paid booths)	12
Total	699

The Intersociety meeting began on October 16 with an opening reception and was followed with a scientific program consisting of 12 symposia, 5 lectures, and a total of 455 poster presentations. On Saturday evening, October 19, **Thomas Hornbein** of the University of Washington presented a lecture entitled "Thoughts While High" to approximately 600 registrants attending the closing banquet.

During the banquet, the organizing committee presented awards for the graduate student abstracts judged to be the best. Eighty-two abstracts (18% of the total submitted abstracts) were submitted for the Graduate Student Award competition for the best poster presentations. Twenty-one finalists were chosen to participate in a closed session of presenters and judges on Friday evening, October 18. The judges listened to and rated each poster presentation to select the six awardees. The awardees were presented with a cash prize, certificate, and textbook donated by Oxford University Press and Human Kinetics Press. The Graduate Student Awardees were Céline Boudreau-Larivière, University of Ottawa, "Rapid Induction of G₄ Acetylcholinesterase Following High-Frequency, Nerve-Derived Electrical Stimulation of Inactivated Muscles"; Richard A. Howlett, University of Guelph, "Regulation of Glycogen Phosphorylase and Pyruvate Dehydrogenase at Different Exercise Power Outputs"; Matthew R. Jackman, Arizona State University, "Electron Transport Chain Conductance in Mitochondria Isolated From Fast and Slow Twitch Skeletal Muscle"; René J.L. Murphy, University of Montreal, "Blockade of Calcium Channels Does Not Reverse Clenbuterol-Induced Muscle Hypertrophy"; Thomas H. Reynolds, NIH and University of Maryland, "Effects of

Exercise Training on Glucose Transport and Cell-Surface GLUT4"; and J. W. E. Rush, SUNY at Syracuse, "Molecular and Kinetic Alterations of Muscle AMP Deaminase During Creatine Depletion."

APS was also able to encourage the participation of underrepresented minority students in the meeting through support provided by the National Institute of Diabetes, Digestive,



Organizer Peter D. Wagner (left) with 1996 Intersociety Meeting student awardeees.

and Kidney Diseases (NIDDK). Recipients of NIDDK Fellowship Awards received complimentary registration and reimbursement of all expenses associated with participation in the meeting. The students receiving support under this program included **William W. Ashley, Jr.**, University of Illinois at Chicago; **Natalie J. Belle**, George Washington University; **Christopher A. DeSouza**, University of Colorado; **Ronald R. Gomes, Jr.**, University of Texas at Houston; **Shane B. Kanatous**, Texas A&M University; **Sylvia Laano**, University of California at Santa Cruz; **Stuart T. Parker**, Northern Arizona University; **James A. Weaver**, Pennsylvania State University; and **Gerald E. Weigle II**, Kansas State University. bers of other nonparticipating societies. Table 2 provides a distribution of abstracts based on submitting department. Twenty-two percent (101) were submitted by female first authors, 22% (101) were submitted by authors at institutions outside The Americas, 28% (130) were submitted by authors at institutions in Canada, and 2% (8) were submitted by authors working in US government laboratories. Ten of the abstracts originally submitted for programming were withdrawn by the authors.

The Society and organizing committee gratefully acknowledge the financial support provided through educational grants from Allos Therapeutics Inc., Scios Nova Inc., the Gatorade Sports Science Institute, and NIDDK.



Poster session from 1996 APS Intersociety Meeting.

Table 2. Departmental Distribution of Submitted Abstracts

Department	No. of Abstracts	Percentage
Kinesiology	64	14%
Exercise/Sports Science	59	12%
Physiology	45	10%
Biology	28	6%
Medicine	14	3%
Nutritional Science	12	3%
Anesthesiology	7	1%
Biochemistry	7	1%

A total of 465 abstracts were submitted to the meeting for poster presenta-23% (107) tion: were sponsored by members of CSEP, 44% (204) by APS members, and 47% (218) by members of ASCM. These figures include 131 abstracts that were sponsored by members of multiple participating societies. In addition, 14% (67) abstracts were sponsored by mem-

1997 APS Conference

The Physiology and Functional Diversity of Amiloride-Sensitive Na⁺ Channels: A New Gene Superfamily October 29–November 1, 1997 • Park City, UT

ORGANIZERS:

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

STEERING COMMITTEE:

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

PROGRAM

WEDNESDAY, October 29, 1997

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

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

The ENaC Family

Barbara Grubb, Chapel Hill, NC

Cecilia Canessa, New Haven, CT; Laurent Schild, Lausanne, Switzerland; Peter Snyder, Iowa City, IA; Bernard Rossier, Lausanne, Switzerland; Edith Hummler, Lausanne, Switzerland; Richard Lifton, New Haven, CT; Catherine Fuller, Birmingham, AL

THURSDAY, October 30, 1997

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

Regulation of Na⁺ Channels

Dennis Ausiello, Boston, MA

Haim Garty, Rehovet, Israel; Sarah Sariban Sohraby, Brussels, Belgium; Nick Johnson, Pittsburgh, PA; Horacio Cantiello, Boston, MA; Iskander Ismailov, Birmingham, AL

FRIDAY, October 31, 1997

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

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

Na⁺ Channels in the Lung

Pierre Barker, Chapel Hill, NC Pascal Barbry, Nice, France; Hugh O'Brodovich, Toronto, Canada; Sadis Matalon, Birmingham, AL; Jackson Stutts, Chapel Hill, NC; Y. Berthiaume, Montreal, Canada; Colleen Talbott, Chapel Hill, NC; William Guggino, Baltimore, MD

SATURDAY, November 1, 1997

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

Mechanosensitive Ion Channels

Cathy Morris, Ottawa, Canada

Ching Kung, Madison, WI; Martin Chalfie, New York; Monica Driscoll, Piscataway, NJ; Mouhamed Awayda, New Orleans, LA; Jean-Michel Achard, Paris, France

Na⁺ Channels and the Cytoskeleton

Fiona McDonald, Iowa City, IA Adrianna Prat, Boston, MA; Daniela Rotin, Toronto, Canada

Clinical Relevance of Amiloride-Sensitive Na⁺ Channels in Genetic Disease

Michael Welsh, Iowa City, IA

David Warnock, Birmingham, AL; Ric Boucher, Chapel Hill, NC

Structural Models of Amiloride-Sensitive Na⁺ *Channels* **Mauricio Montal,** San Diego, CA

Tom Kleyman, Philadelphia, PA; **Jean-Daniel Horisberger**, Lausanne, Switzerland; **Robert Guy**, Bethesda, MD

1998 APS Conference The Paraventricular Nucleus of the Hypothalamus: A Crossroads of Integrative Physiology December 5–9, 1998 The Menger Hotel, San Antonio, Texas

ORGANIZER:

Joseph R. Haywood

University of Texas Health Sciences Center, San Antonio

STEERING COMMITTEE:

Alan K. Johnson

University of Iowa Arthur D. Loewy Washington University

Leo P. Renaud

University of Ottawa Catherine Rivier Salk Inst.

A. J. W. Scheurink

University of Groningen, The Netherlands

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

Tentative Invited Sessions

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

Integration of Ingestive Behaviors

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

Role in Metabolism and Energy Balance

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

Neuroendocrine Regulation

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

Stress and the Immune System

Catherine Rivier, Salk Institute; Serge Rivest, Laval University; Dwight Nance, University of Manitoba; Adrian Dunn, Louisiana State University Medical Center; James Herman, University of Kentucky

Control of Cardiovascular-Renal Function

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

Deadline for 1999 Conference Proposals is February 15, 1997

For more information



contact Linda Allen APS Membership Services Office

Phone: 301-530-7171

E-mail: meetings@aps.faseborg

Just Approved 1998 APS Conference

Endothelial Regulation of Vascular Tone: Molecular to Integrative Physiology Augusta, Georgia

ORGANIZER:

David M. Pollock Medical College of Georgia

STEERING COMMITTEE:

Jennifer S. Pollock Medical College of Georgia John D. Catravas

Medical College of Georgia

L. Gabriel Navar Tulane University Harris J. Granger

Texas A&M University

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

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

Tentative Schedule

Day 1

Discovery of EDRF Salvador Moncada, University College, London

Signal Transduction and Gene Regulation

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

Day 2

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

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

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

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

Oral Communications on Nitric Oxide

TGF in Fibrotic Disease **Wayne Border**, University of Utah

Day 3

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

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

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

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

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

Oral Communications on Endothelin, Renin-Angiotensin, Prostaglandins

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

Day 4

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

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

Shear Stress

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

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

Oral Communications on Growth Factors and Shear Stress

Endothelial Gene Transfer in Restenosis Elizabeth Nabel, University of Michigan

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

Symposia

Sunday, April 6, 8:30 AM

Refresher Course for Teaching Respiratory Physiology S. E. DiCarlo Are We Losing Our Expertise With Whole Animal Physiology, and Does That Matter?

C. T. Hawk

Sunday, April 6, 2:00 PM

Challenges Facing Undergraduate, Graduate, and Medical Physiology Teachers: Are They the Same?

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

Monday, April 7, 8:30 AM

Cellular and Molecular Basis of Capillary Permeability J. E. Schnitzer Estrogen Replacement Therapy: Benefits, Risks and Future Outlook M. T. Ravi Subbiah and B. Sherwin (with the Society for Experimental Biology and Medicine)

Monday, April 7, 2:00 PM

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

Regulating Epithelia from their Apical Side: Novel New Mechanisms of Autocrine and Paracrine Signaling

K. Karnaky, Jr. The NO Signal Transduction System in the Lung: From Molecular Biology to Bedside Therapy

W. M. Zapol and K. D. Bloch Cellular Interactions With Tissue Analogs and Biomaterials

P. V. Moghe and F. Berthiaume (with the Biomedical Engineering Society)

Tuesday, April 8, 8:30 AM

Glucagon-Like Peptide-1 and the Control of Insulin-Glucose Homeostasis
S. Mojsov and E. M. Plisetskaya
Neurobiology of Temperature Regulation: Role of Stress
S. Wood and M. Kluger
Novel Signal Transduction Mechanisms in the Vasculature
S. W. Watts and C. A. Davison
Molecular Mechanisms of Cell-Cell Interactions Under Dynamic Flow Conditions
L. V. McIntire and J. M. Ross (with the North American Society for Biorheology)

Tuesday, April 8, 2:00 PM

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

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

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

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

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

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

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

Wednesday, April 9, 8:30 AM

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

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

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

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

Wednesday, April 9, 2:00 PM

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

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

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

Physiology InFocus Experimental Biology '97 Cell Signaling: Multiple Pathways, Integration and Crosstalk April 6-9, 1997 • New Orleans, LA

Organizer:

William W. Chin Harvard Medical School

Sunday, April 6, 1997 (2:00 – 5:00 PM)

Molecular Physiology of Obesity Jeffrey M. Friedman Rockefeller University Leonard S. Jefferson Pennsylvania State University, Hershey

Topics:

Molecular Genetics of ObesityJeffrey Friedman, Rockefeller UniversityTransgenic Models of ObesityLeslie Kozak, Jackson Laboratories, Bar Harbor, MEC/EBP and the AdipocyteDaniel Lane, Johns Hopkins School of Medicine

Neuropeptide Y Gene and Obesity in Transgenic Mice Richard Palmiter, University of Washington School of Medicine

Monday, April 7, 1997 (8:30 – 11:30 AM)

Integration of Signal Transduction in Hormone Action Via Nuclear Receptors Benita Katzenellenbogen

University of Illinois, Urbana

Topics:

Estrogen Receptor Action: Regulation by Steroid Hormones, Second Messengers and Growth Factors Benita Katzenellenbogen, University of Illinois, Urbana Estrogen Receptor-Growth Factor Interrelationships Kenneth Korach, NIEHS, Research Triangle Park, NC Ligand-Independent Activation of Nuclear Receptors and the Role of Coactivators

Bert O'Malley, Baylor College of Medicine

Integration of Nuclear Receptor Action Via Coactivators **M. Geoffrey Rosenfeld,** University of California at San Diego

Monday, April 7, 1997 (2:00 – 5:00 PM)

Growth Factors, Nuclear Receptors and Crosstalk C. Ronald Kahn Joslin Diabetes Center, Harvard Medical School

Topics:

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

Tuesday, April 8, 1997 (8:30 – 11:30 AM)

Nuclear Receptors, Crosstalk and the Brain Donald Pfaff Rockefeller University

Topics:

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

Wednesday, April 9, 1997 (8:30 – 11:30 AM)

Thyroid and Steroid Hormones in Nongenomic Action Jack Leonard University of Massachusetts School of Medicine

Topics:

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

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



HENRY PICKERING BOWDITCH AWARD

David H. Wasserman Vanderbilt University

The Study of Glucoregulatory Mechanisms Using the Challenge of Muscular Work

MONDAY, APRIL 7 5:15 рм



WALTER B. CANNON MEMORIAL AWARD (SUPPORTED BY THE GRASS FOUNDATION)

Ernst Knobil University of Texas, Houston

The Wisdom of the Body Revisited

SUNDAY, APRIL 6 5:15 рм

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

Jurgen Schnermann University of Michigan

Renal Salt Excretion and the Juxtaglomerular Cell Complex

MONDAY, APRIL 7 8:30 AM

ROBERT M. BERNE DISTINGUISHED LECTURESHIP OF THE CARDIOVASCULAR SECTION

Loring B. Rowell University of Washington

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

MONDAY, APRIL 7 2:00 PM

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

Claus Jessen Physiologisches Institut

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

TUESDAY, APRIL 8 8:30 AM





Gottingen, Germany

MONDAY, APRIL 7 11:45 AM

SECTION

Tulane University

Paracrine Regulators of

TUESDAY, APRIL 8 8:30 AM







The Physiologist

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Distinguished Lectureships

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

Vernon S. Bishop University of Texas, San Antonio

Baroreflex Regulation: Effects on Sympathetic Outflow

MONDAY, APRIL 7 8:30 AM

HUGH DAVSON DISTINGUISHED LECTURESHIP OF THE CELL AND GENERAL PHYSIOLOGY SECTION

Erwin Neher Max Planck Institute

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

CARL W. GOTTSCHALK DISTINGUISHED LECTURESHIP OF THE RENAL PHYSIOLOGY

L. Gabriel Navar

Integrative Multiple Renal Microvascular **Dynamics**

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



HORACE DAVENPORT DISTINGUISHED LECTURESHIP OF THE GASTROINTESTINAL SECTION

John B. Furness University of Melbourne

Neural Control of Digestive Function: The Intrinsic Circuit

Tuesday, April 8 11:45 am



JOSEPH ERLANGER DISTINGUISHED LECTURESHIP OF THE CENTRAL NERVOUS SYSTEM SECTION

William Pardridge University of

California, Los Angeles

Molecular Regulation of the Blood-Brain Barrier GLUT1 Glucose Transporter

TUESDAY, APRIL 8 12:45 pm



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

C. Ronald Kahn Joslin Diabetes Center, Boston

Intracellular Internet of Insulin Signaling and Its Alterations in Disease

TUESDAY, APRIL 8 2:00 pm



August Krogh Distinguished Lectureship of the Comparative Physiology Section

Johannes Piiper Max Planck Institute for Experimental Medicine

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

WEDNESDAY, APRIL 9 8:30 AM



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

Bernard C. Rossier University of Lausanne

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

Wednesday, April 9 12:45 pm

Saxtons River Vermont

Cytokines and Lipid Mediators **Biological Methylation** Autoimmunity Ubiquitin and Protein Degradation Hematopoietic Neoplasms Transcription Initiation in **Prokaryotes** Intestinal Lipid Absorption, Metabolism and Transport Vitamin K and the Synthesis, Structure and Function of Vitamin K-dependent Proteins Thrombin and Vascular Medicine

Summer Research Conferences Microbial Polysaccharides of Medical, Agricultural and Industrial Importance Smooth Muscle Endothelium and Cardiovascular Function Ciliate Molecular Biology Amyloid and Other Abnormal **Protein Assembly Processes** Transport of Amino Acids, **Peptides and Bioactive** Monoamines: Structural, Functional and Regulatory Aspects Gastroinestinal Tract VII: Epithelial Cell Development, Differentiation and Regulation Drugs of Abuse: The Role of Neural and Behavioral Plasticity in Chronic Drug Abuse Perinatal Regulation of the Cardiovascular System

Snowmass Village Colorado

Chromatin and Transcription The Ras Superfamily of Small **GTP-binding** Proteins **Recombination and Genome** Rearrangements **Protein Kinases and Protein Phosphorylation**

Keystone Resort Colorado

Biology and Chemistry of Vision

To receive complete conference schedules and the application form (available in Feb., 1997), contact:

FASEB Summer Research Conferences Office				
9650 Rockville Pike	Bethesda, MD 20814-3998	FAX 301-571-0650	E-mail: src@faseb.org	
http://www.faseb.org/meetings/src/srcmp2.htm				

FASEB MEMBERS WILL AUTOMATICALLY RECEIVE MEETING BOOKLET IN FEBRUARY.

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STATE	ZIP CODE	COUNTRY	

Final Announcement XXXIII IUPS Congress St. Petersburg, Russia June 30 – July 5, 1997

Important Dates and Deadlines

February 28, 1997

- Deadline for registration and payment with lower registration fees
- Deadline for one night hotel and dormitory deposit payment
- Deadline for receipt of abstracts

April 30, 1997

- · Deadline for full hotel and dormitory payment
- Deadline for all other remaining payments

Before April 30, 1997

· Refund of 50% for cancellation of tours and congress related events

Refund of 50% for cancellation of registration

• Refund of 50% for cancellation of hotel and dormitory

After April 30, 1997

• No refund for any payments

Program

The scientific program for the Congress was developed by an International Program Committee cochaired by **Pavel Simonov** (Moscow, Russia) and **Stanley G. Schultz** (Houston, TX). The theme of the scientific program will be "Integrative Physiology: From Molecules to Humans," a logical extension of the "date with the future of physiology" theme of the 1993 IUPS Congress in Glasgow. Each morning and afternoon session will open with a Plenary Lecture delivered by a scientist of international renown; the ten lectures will cover the spectrum of integrative physiology from intracellular signaling through emotions and cognition.

Complementing the symposia will be approximately thirty workshops dealing, more informally, with timely subjects. As at past Congresses, there will be poster sessions organized by topics and coordinated with the symposia and workshops. A call for posters will be published in the final announcement. A workshop on teaching physiology will be organized the week following the Congress.

Following is an updated program for the XXXIII IUPS Congress.

Roundtable on Integrative Physiology

Integration of Function: That Is What Physiology Is About, So What Is the Problem? **D. Noble** (UK) and **E. R. Weibel** (Switzerland)

Plenary Lectures

On the Human Brain - Opening Ceremony **N. P. Bechtereva** (Russia) *Water and Salt Metabolism in Humans: From Physiology*

to Molecular Pathology P. Corvol (France)

- Molecular Mechanisms Underlying Mammalian Development P. Gruss (Germany)
- *How Hearing Happens: Transduction, Tuning, and Transmission by Hair Cells* **A. J. Hudspeth** (USA)

Central Nervous System (Fenn Lecture) E. Kandel (USA)

The Central, Circhoral Signal Generator That Governs Reproduction E. Knobil (USA) Design and Use of Muscles for Maximal Performance R. M. Alexander (UK)

- Neuroreceptor to Brain Function S. Nakanishi, (Japan)
- The Epithelial Sodium Channel: From Physiology to Physiopathology B. C. Rossier (Switzerland)

Machinery and Mechanisms of Intracellular Protein Transport and Synaptic Transmission J. E. Rothman (USA)

Conditional Reflex and Psychophysics in the Framework of Neurophysiology E. N. Sokolov (Russia)

Cellular and Molecular Physiology

Symposia

- 001 Intracellular Messengers A. N. Malviya (France) and O. H. Peterson (UK)
- 002 Molecular Mechanisms of Ion Channel Control P. G. Kostyuk (Ukraine) and W. Stuhmer (Germany)
- **003** Membrane Traffic and Protein Sorting **M. Cereijido** (Mexico) and **E. J. Rodriguez-Boulan** (USA)
- 004 Nitric Oxide: Regulator of Renal Vascular and Tubular Function T. F. Luscher (Switzerland) and L. G. Navar (USA)
- 005 Steroid Receptors E. V. Jensen (Germany) and M. Muramatsu (Japan)
- **006** *Epithelial Transporters* **S. C. Hebert** (USA) and **H. Murer** (Switzerland)
- 007 Non-genomic, Rapid Actions of Steroid HormoneY. Z. Chen (China) and R. L. Moss (USA)
- 008 Apoptosis P. Davies (USA)
- 009 Gastric Acid Secretion and Cytoprotection S. J. Konturek (Poland) and G. Sachs (USA)
- 100 Calcium Homeostasis I. MacIntyre (UK) and J. Potts (USA)

Workshops

- 010 Functional Neurochemistry of Excitatory Amino Acid Receptors S. A. Dambinova (Russia) and R. J. Winthold (USA)
- 011 Cross-Talk Between Apical and Basal Membranes in Epithelia B. J. Harvey (Ireland)
- 012 Local Calcium Signaling and Calcium Channels I. Schulz (Germany)
- 013 Epithelia of the Eye M. M. Civan (USA)
- 014 Control of Internal Ion Concentration C. O. Lee (Korea)
- 015 Ion Co- and Countertransporters R. DiPolo (Venezuela)
- 016 Cellular Compartmentation J. Hoffman (USA)
- 017 Cell Modeling H. J. Jongsma (The Netherlands)
- 018 Gap Junctions: From Molecular Biology to Tissue Function P. R. Brink (USA)
- 019 Oxidant Regulation of Cellular Functions S.J. Elliott (USA)
- 020 Structure, Function and Regulation of ATPases in Epithelia K. Geering (Switzerland)

- 021 Developmental Aspects of Ion Transport L. N. Ivanova (Russia)
- 022 Nuclear Pores H. Oberleithner (Germany)
- **023** Local Ca²⁺ Signaling in Nerve and Muscle W. Lederer (USA)

Ion-Water Balance and Renal Physiology Symposia

- 024 Aquaporins and Water Transport P. Agre (USA) and S. Sasaki (Japan)
- 025 Cell Volume Regulation M. Burg (USA) and F. Lang (Germany)
- **026** Regulation of Salt and Water Metabolism **M. P. Blaustein** (USA) and **P. B. Persson** (Germany)
- 027 Renin-Angiostensin System D. Ganten (Germany) and M. I. Phillips (USA)

Workshop

028 Renal Transport of Organic Anions and Cations K. J. Ullrich (Germany)

Respiration

Symposia

- **029** *Respiratory Mechanics* **P. T. Macklem** (Canada) and **G. Miserocchi** (Italy)
- 030 Control of Respiration S. Lahiri (USA) and P. Scheid (Germany)
- 031 Gas Exchange and Pulmonary Circulation J. P. Dvoretsky (Russia) and J. B. West (USA)
- 032 Respiration in Extreme Environments P. Cerretelli (Switzerland) and V. S. Novikov (Russia)

Workshop

033 Respiratory Tract Electrolyte Transport in Health and Disease **E. H. Larsen** (Denmark)

Muscle Physiology

Symposia

- 034 Excitation Contraction Coupling and Molecular Mechanisms of Contraction C. Franzini-Armstrong (USA) and H. Sugi (Japan)
- 035 Molecular Motors R. S. Orlov (Russia) and J. Spudish (USA)
- 036 Pacemaker Activities in Cells A. Noma (Japan) and K. M. Sanders (USA)

Workshops

- **037** Membrane and Intracellular Mechanisms of Contraction Activation in Smooth Muscles M. F. Shuba (Ukraine)
- 038 Muscle Fibers Composition: Effects on Performance F. Booth (USA)

Environmental Physiology

Symposia

- 040 Cellular Mechanisms in Thermal Regulation J. A. Boulant (USA) and E. Simon (Germany)
- 041 Adaptation to the Environment M. Horowitz (Israel) and V. I. Medvedev (Russia)
- 042 Maximal Performance in Locomotion G. A. Cavagna (Italy) and B. Saltin (Sweden)

- 043 Physiological Adaptation of Muscle to Use S. Schiaffino (Italy) and R. J. Schwartz (USA)
- 044 *Oxygen, Antioxidants and Exercise* S.P. Chatterjee (India) and O. Hanninen (Finland)
- 045 Space Physiology A Grigoriev (Russia) and J. Vernikos (USA)

Workshops

- 046 Comparative Aspects of Temperature Regulation in Homeotherms L. Folkow (Norway)
- 047 Physiological Aspects of Exposure to Electromagnetic Fields K. H. Mild (Sweden) and E. B. Lyskov (Russia)

Endocrinology

Symposia

- 048 *Neuroendocrine Effects of Cytokines* K. Fuxe (Sweden) and C. B. Saper (USA)
- **101** Neuroendocrine Control of Thirst **M. McKinley** (Australia) and **A. K. Johnson** (USA)

Workshop

049 Pancreatic B Cell Regulation S. Misler (USA)

GI and Nutrition

Symposia

- **050** *Motility and Enteric Nervous System* **J. B. Furness** (Australia) and **M. A. Medvedev** (Russia)
- **051** *Gut Endocrine Mechanisms* **J. J. Holst** (Denmark) and **R. A. Liddle** (USA)
- 052 Control of Food Intake Y. Oomura (Japan) and G. Smith (USA)
- **053** *Epithelial Secretion* **P. Y. D. Wong** (Hong Kong) and **J. A. Young** (Australia)
- **054** *Gut Growth and Differentiation* **L. R. Johnson** (USA) and **E. Rozengurt** (UK)

Cardiovascular

Symposia

- **055** Regulation of Endothelium and Vascular Smooth Muscle Ion Channels J. Daut (Germany) and F. S. Fay (USA)
- **056** Local Control of Blood Flow **H.J. Granger** (USA) and **R. S. Reneman** (The Netherlands)
- **057** *Cardiac Factors and Vascular Development: Transcription to Function* **K. R. Chien** (USA) and **Y. Shevchenko** (Russia)
- **058** Regulation of Arterial Pressure, Cardiac Output and Body Fluid Volumes J. E. Hall (USA) and O. S. Medvedev (Russia)
- **059** Genetic Models of Human Vascular Diseases V. J. Dzau (USA) and E. J. Mullins (UK)
- 060 Electromechanical Aspects of Cardiac Function M. R. Rosen (USA) and L. V. Rosenschtraukh (Russia)
- 061 Neural Regulation of Blood Vessels F. Abboud (USA) and V. M. Khayutin (Russia)

Workshops

- 062 Nitric Oxide and Microcirculation G. Kaley (USA)
- 063 Coronary Physiology and Cardiac Metabolism E. Feigl (USA)
- 064 Myocardial Calcium B. Lewartowski (Poland)
- 096 Blood-Brain Barrier W. Kuschinsky (Germany)

Fetal Physiology

Symposia

- **065** *Fetal Maternal Interactions* **J. R. G. Challis** (Canada) and **P .D. Gluckman** (New Zealand)
- **066** *Prenatal Development of Organ Functions* **E. R. Lumbers** (Australia) and **F. A. Van Assche** (Belgium)

Autonomic Nervous System

Symposia

- **068** *Transmission in Autonomic Ganglia* **E.M. McLachlan** (Australia) and **V I. Skok** (Ukraine)
- 069 Visceral Afferent Mechanisms D. Grundy (UK) and V. G. Kassil (Russia)
- **070** Neural Mechanisms of Somatic and Autonomic Interactions A. D. Nozdrachev (Russia) and A. Sato (Japan)

Ecological and Comparative Physiology

Symposia

- 071 The Evolution of Visual Systems J. K. Bowmaker (UK)
- **072** Evolution of Physiological Systems **P. Hochachka** (Canada) and **V. L. Svidersky** (Russia)
- **073** Integrative Physiology and Evolutionary Design J. M. Diamond (USA) and E. R. Weibel (Switzerland)

Synaptic Functions and Plasticity

Symposia

- 074 Dynamics and Plasticity in the Visual System U. Eysel (Germany) and C. Gilbert (USA)
- 075 Mechanisms of Synaptic Transmitter Change P. Andersen (Norway), G. Collingidge (UK), and L. L. Voronin (Russia)

Workshop

076 Control of Synaptic Release S. Tucek (Czech Republic)

Motor Functions

Symposia

- **077** Motor Maps and Population Coding in the Central Nervous System **A. Georgopulos** (USA) and **U. Windhorst** (Canada)
- **078** *Posture and Locomotion* **A Berthoz** (France) and **V. S. Gurfinkel** (Russia)

Sensory Systems

Symposia

- 079 *Mechanotransduction* **R. Busse** (Germany) and **O. P. Hamill** (USA)
- 080 Central Visual Processing I. A. Shevelev (Russia) and W. Singer (Germany)
- 081 Auditory Processing J. Altman (Russia) and M. Konishi (USA)
- 082 Cellular and Molecular Mechanisms of Sensory Transduction J. F. Ashmore (UK) and D. A. Baylor (USA)
- 083 Somatosensory System Y. Iwamura (Japan) and M. J. Rowe (Australia)
- **084** *Pain: From Molecules to Perception* **H. O. Handwerker** (Germany) and **W. Willis** (USA)

Workshop

085 Mechanisms of Electro- and Echolocation N. Suga (USA) and A. Y. Supin (Russia)

High Nervous Activity and CNS

Symposia

- 086 Conscious Vision (IBRO-IUPS) S. Zeki (UK)
- 087 Non-Invasive Study of Higher Brain FunctionsR. Hari (Finland) and M. E. Raichle (USA)
- 088 Emotions: Interdisciplinary Approach R. J. Davidson (USA) and T. Ono (Japan)
- **089** Neural Systems for Learning and Memory **Y. Miyashita** (Japan) and **L. R. Squire** (USA)
- **090** Conciousness and Attention Y. D. Kropotov (Russia) and R. Natanen (Finland)
- **091** Brain Systems Underlying Cognition A. M. Ivanitsky (Russia) and M. Posner (USA)
- **067** *Functional Organization of the Brain in Human Ontogenesis* **D.A. Farber** (Russia) and **A. Diamond** (France)
- **099** Genetic and Learned Mechanisms in Ingestive Behavior **D. Denton** (Australia) and **J. Fitzsimons** (UK)
- **104** *The Neurobiology of Sleep* **M. Jouvet** (France) and **M. Mukhametov** (Russia)

Workshop

092 Memory Processes and Their Cellular Mechanisms **K. V. Anokhin** (Russia) and **S. Rose** (UK)

Clinical Physiology

Symposium

093 Ischemia: From Channel to Organ **D. J. Hearse** (UK) and **G. N. Kryzhanovsky** (Russia)

Workshop

094 *Physiological Problems of Transplantation and Artificial Organs* **V. I. Shumakov** (Russia)

Immunology

Workshop

095 Neuroimmunology M. Rosental (USA) and I. Stolyarov (Russia)

General

Symposium

097 *Physiology and the Limits of Man: The Ethical Issues* **A.M. Genin** (Russia), **K. Hartiala** (Finland) and **J. Vincent** (France)

Workshop

098 *History of Physiology* **M. M. Khananashvily** (Russia) and **T. Tansey** (UK)

Special Lectures

Robert Pitts Lecture A. Doucet (France) Adrian and Zotterman Lecture C. Belmonte (Spain)

Satellites

- Neurophysiology and Neurochemistry of Conditioned Reflex N. F. Suvorov (Russia)
- Molecular and Genetic Bases of Adaptive Behavior M. O. Samoilov (Russia)
 - WI. O. Samonov (Russia)
- Intracellular Signaling in Neurons: Mechanism and Function P. G. Kostyuk (Ukraine)

Workshop and Training Course

Teaching Physiology to be held in conjunction with the 33rd International Congress of Physiology, July 6-9, 1997

Travel Grant Program Extended to March 1

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

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



Church of the Resurrection of Christ.



Peter's Palace in Petrodvoretz.

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

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

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

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

Name:	
Address:	
	Fax:

• Have travel plans that include other professional visits or work.

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

Traveling to the IUPS Congress

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



Surname

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

Please mail six co	ppies of this app	lication to:	USNC/IUPS National Acade ATTN: Robin 2101 Constitut Washington, D	emy of Science Schoen on Avenue, NV C 20418	s W	Deadline:	March 1, 1997
1. Name and De	gree:				Year of high	est degree:	
2. Faculty positi	on or employr	nent title:			Yea	ar of Birth:	
3. Address:							
4. Phone Number	er:			Fax N	umber:		
5. E-mail Addre	ss:						
6. Country of ci	tizenship:		Visa	status if not	US citizen:		
7. Underreprese	nted Minority	Applicants:	Please circle eth	nic group to	which you b	elong:	
Africar	n American	Hispar	ic Nati	ve American	Pac	ific Islander	
8a. Gender: Mal	le Fema	ale	8b. Do you ne	ed special as	sistance or a	ccommodations?	
9. Attending ent	ire Congress?	Yes	No	If not, which	days will yo	ou attend?	
Will you pres	ent an invited	paper or pos	ster at the Cong	ress?	Yes	No	
If so, please i	ndicate the ses	ssions you w	vill address. If i	nvited, attach	letter of inv	itation.	
Invited to giv	e public lectur	e (give title)	:				
Invited to Co	ngress sympos	ium (give ti	tle; indicate cha	rman):			
10. Do you inter	nd to submit a	poster? (If y	ves, please give	title):			
11. Please descr	ibe your area o	of specialty	(e.g. cell physio	logy, cardiova	ascular physi	ology, neurophys	iology, etc.):
12. Member of:	APS	SGP	Div .Comp.	Physiol. & B	iochem., AS	Z Soc. 1	Neurosci.
	BMES	Microci	rc. Soc.	Other			
13. Are you emp	ployed by the f	ederal gove	rnment more that	n half-time?	Yes	No	
14. Travel:	a. City of de	parture		b. Suppo	rt requested		
	c. Amount o	f other supp	ort available (ex	cluding perso	onal)		
15. Recent publ	ications (not m	ore than 5 t	itles, giving full	refs). If listi	ng abstracts	or manuscripts in	press, please indicate.

Surname _____

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

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

International Joint Meeting of The Sociedad Española de Ciencias Fisiológicas and The American Physiological Society February 4-7, 1997 Hotel Alay of Puerto Marina, Benalmádena, Spain

The International Joint Meeting of The Sociedad Española de Ciencias Fisiológicas (SECF) and APS on February 4-7, 1997 will be held in Benalmádena, in the center of the Costa del Sol. The meeting will be located in the Hotel Alay of Puerto Marina. The joint meeting coincides with the 28th National Congress of the SECF.

PRELIMINARY SCIENTIFIC PROGRAM

TUESDAY, February 4, 1997

Welcome Reception

WEDNESDAY, February 5, 1997

Respiratory Integration
S. González Barón, Málaga, Spain; M. S. Dawid Milner, Málaga, Spain; A. I. Pack, Philadelphia, PA

Physiological and Nutritional Aspects of Aging J. Mataix, Granada, Spain; S. DiMauro, New York

Mapping the Cerebral Cortex of Man with PET and FMRI Plenary Lecture by P. Roland, Stockholm, Sweden

Central Cardiovascular Control J. A. Narváez, Málaga, Spain; J. P. Lara, Málaga, Spain; C. M. Ferrario, Winston-Salem, NC

Body-Brain Temperature: New Perspectives F. Mora, Madrid, Spain; C. V. Gisolfi, Iowa City, IA

THURSDAY, February 6, 1997

Endothelial Control of Renal Function J. P. Granger, Jackson, MS; J. Salazar, Murcia, Spain

Actions of Hormones and Endocrine Peptides on the Central Nervous System

J. Bernal, Madrid, Spain; L. de Lecea, La Jolla, CA

Varied Regulation of Salt Reabsorption by the Collecting Duct Plenary Lecture by J. A. Schafer, Birmingham, AL

Mathematical Modeling of Physiological Systems L. Roa, Sevilla, Spain; L. G. Navar, New Orleans, LA Plasticity and Regeneration in the Central Nervous System of Adult Mammals

J. M. Delgado, Sevilla, Spain; D. L. Alkon, Bethesda, MD

Melatonin: An Endogenous Cell Protector **D. Acuña,** Granada, Spain; **R. J. Reiter,** San Antonio, TX

General Meeting of the "Sociedad Española de Ciencias Fisiológicas"

FRIDAY, February 7, 1997

Epithelial Membrane Transport **A. Ilundain,** Sevilla, Spain; **J. Bolufer,** Sevilla, Spain; **P. S. Aronson,** New Haven, CT

Homeostatic Drives During Exercise E. R. Nadel, New Haven, CT; V. J. Fernández Pastor, Málaga, Spain

Renal Physiopathology and Diabetes A. Palma, Sevilla, Spain; J. M. González Molina, Málaga, Spain

Physiological Breakthroughs: Past Limitations and Present PossibilitiesPlenary lecture by K. Schmidt Nielsen, Durham, NC

Teaching of Physiology in Spain **R. Alonso,** Tenerife, Spain; **A. Morales,** Alicante, Spain

For a complete meeting program, contact:

International Joint Meeting of SECF-APS Dr. Martin Frank, Executive Director American Physiological Society 9650 Rockville Pike Bethesda, MD 20814-3991 301-530-7118 301-571-8305 (fax)

Public Affairs

(continued from page 377)

BION MISSIONS: During Senate debate on NASA funding, an amendment was offered that would have ended US participation in two international missions to study how the space environment affects upright primates. The joint US-French-Russian Bion missions involve the use of rhesus monkeys and had been the focus of animal activist opposition for more than a year. The House had approved an amendment to terminate US participation in the Bion missions that was couched in terms of avoiding wasteful spending for research that was scientifically and ethically questionable. The Senate Appropriations Committee, recognizing that the research had been approved through peer review, restored the funds for the program. On September 4 the Senate voted 54-42 against an amendment to eliminate the program. The positive outcome was secured when the House agreed to the Senate position in conference.

CLASS B DEALERS: A House Agriculture Subcommittee held hearings August 1 on two bills to eliminate Class B dealers as suppliers of random source animals for research. Efforts to abolish Class B dealers are gaining momentum because a wide range of animal protectionist and animal activist organizations are bombarding Congressional offices with allegations of wide-spread pet theft and questionable activities by Class B dealers. USDA has also indicated that it supports ending the role of Class B dealers as suppliers of dogs and cats for research because of the difficulty of enforcing Animal Welfare Act provisions regulating Class B dealers activities. APS submitted testimony reminding the subcommittee of scientists' support for appropriate animal welfare laws, reiterating the importance of nonpurpose-bred animals to certain kinds of research, and reaffirming the importance of adequate USDA enforcement of the existing laws.

PET PROTECTION BILLS: In the closing days of the 104th Congress, Sen. Daniel Akaka (D-HI) also introduced a "pet safety and protection" bill in the Senate. Also, retiring Rep. Steve Gunderson (R-WI) introduced a bill to expand USDA's enforcement powers, including giving it the authority to issue injunctions against a research facility suspected of buying stolen animals, placing the health of an animal in danger, or believed to be somehow in violation of the Animal Welfare Act. These bills all died when Congress adjourned, but we can expect more legislative activity on this subject during the 105th Congress. 🗇

Table 3. FY 1997 Appropriations for NIH Institutes, Centers, and Divisions

Institute or Center	FY 1996 Comparable	FY 1997 Request	FY 1997 Final
National Cancer Institute	\$2,248.0	\$2,280.9	\$2,382.5
National Heart, Lung, and Blood Institute	1354.9	1378.7	1433.0
National Institute of Dental Research	162.9	186.8	196.0
National Institute of Diabetes and Digestive and Kidney Diseases	770.6	784.9	816.0
National Institute of Neurological Disorders and Stroke	680.9	695.1	726.7
National Institute of Allergy and Infectious Diseases	1168.5	1208.7	1257.2
National Institute of General Medical Sciences	946.9	963.6	998.5
National Institute of Child Health and Human Development	594.5	603.7	631.7
National Eye Institute	313.9	319.2	332.7
National Institute of Environmental Health Sciences	288.4	295.1	308.8
National Institute on Aging	453.5	463.4	486.0
National Institute of Arthritis and Musculoskeletal and Skin Disease	s 242.7	247.1	257.1
National Institute on Deafness and Communication Disorders	176.4	180.8	188.4
National Institute of Mental Health	660.5	671.2	701.6
National Institute on Drug Abuse	458.1	466.3	489.4
National Institute on Alcohol Abuse and Alcoholism	198.4	202.6	212.0
National Institute of Nursing Research	55.8	57.0	59.7
National Center for Research Resources	390.3	377.6	415.1
National Center for Human Genome Research	169.8	178.9	189.7
Fogarty International Center	25.3	25.5	26.6
National Library of Medicine	140.9	146.6	151.1
Office of the Director	260.1	226.9	287.2
Buildings and Facilities	146.2	420.0	200.0
TOTAL	\$11,927.6	\$12,406.3	\$12,747.2

Dollars in millions. Includes AIDS. Numbers may not add due to rounding.

Election 1996: No Surprises But a Few Questions

The recent election produced no big surprises on the national scene and is unlikely to result major changes for biomedical research issues in the coming year. "Divided government" — with the Democrats controlling the White House and the Republicans in charge on Capitol Hill — will continue. It was during the preceding two years of divided government that NIH was provided with generous annual funding increases of 5.7 and 6.9 percent, respectively. (The 6.9 percent increase included \$90 million for clinical center modernization.)

However, it remains to be seen how the second Clinton Administration will deal with the Republican-dominated 105th Congress. Among the new dynamics to be played out are an FY 1996 budget deficit that was smaller than expected thanks to strong economic growth and a diminished Republican majority in the House combined with a strengthened Republican majority in the Senate. The key question for biomedical research funding is how much pressure will there be to make further progress on deficit reduction by cutting domestic programs such as the NIH.

Among the most siginificant changes for biomedical research were the retirements two long-time NIH supporters. Sen. Mark Hatfield (R-OR) was the chair of the Senate Appropriations Committee in the 104th Congress. Before that, he had been the panel's ranking Republican and always an important advocate for biomedical research funding. Hatfield sought to increase funds for NIH not only through the regular appropriations process but also by proposing that a special trust fund be established to supplement NIH's appropriations through a surcharge on insurance policies or a tax on tobacco products. Hatfield's expected successor as Appropriations Committee Chair is Sen. Ted Stevens (R-AK), who has also been supportive of NIH funding although less involved in the issue than Hatfield was.

The other key retirement was that of Sen. Nancy Kassebaum (R-KS), who chaired the Senate Labor and Human Resources Committee. Deeply concerned about the administrative burdens Congress has placed on NIH over the years, she worked doggedly to secure passage of NIH reauthorization legislation. The Kassebaum bill would have relieved agency of its obligations to convene certain advisory committee and to provide Congress with periodic reports on certain topics. The bill passed the Senate in the closing days of the 104th Congress, but was never considered by the House because abortion opponents wanted language that would forbid NIH from providing funding for fetal tissue or human embryo research at NIH. Such language is already routinely included as part of NIH funding bills. It is unclear whether or when the 105th Congress might take up reauthorization since NIH can conduct most of its activities under the permanent authority of the Public Health Service Act without the special authorizing legislation.

Next in line to succeed Kassebaum as chair of the Labor and Human Resources Committee is Sen. James Jeffords (R-VT). However, he could face a challenge from Sen. Dan Coats (R-IN) on the grounds that Jeffords is too liberal to hold the post in a conservative-dominated Senate.

Committee assignments and leadership positions are to be decided when the party caucuses convene in November and December. Vacant chairmanships usually set off a chain reaction of committee-hopping as members use their seniority to angle for the most desirable assignments.

Hatfield's retirement has been the biggest change so far in the Senate Appropriations Subcommittee on Labor-HHS-Education, which funds NIH. Sen. Tom Harkin (D-IA) managed to win a tough election and will retain his position as ranking Democrat on the Senate subcommittee. There has been speculation that Sen. Arlen Specter (R-PA), chairman of the Senate Subcommittee, might opt to move to the influential Senate Finance Committee.

In the House, Rep. John Porter, R-IL, will return as chairman of the Labor-HHS-Education Subcommittee, with Rep. David Obey (R-WI) as the ranking Democrat. Porter's strong support has been critical to the large funding increases NIH has received over the past two years. There may be one less Republican on the House subcommittee because the House Republican majority has narrowed slightly, and in that case Porter may have to work more closely with the subcommittee's Democrats, whose support for NIH is tempered by their support for other educational and social programs funded by the subcommittee.

One unfortunate development was the electoral defeat of Rep. Harold Volkmer, D-MO, a member of the House Agriculture subcommittee with jurisdiction over the Animal Welfare Act. Rep. Volkmer was a strong voice on behalf of the humane use of animals in biomedical research, and he will be missed.

Public Affairs Meeting Announcement

The Kennedy Institute of Ethics at Georgetown University announces that its spring course and conference entitled **"Applied Ethics in Animal Research: From Theory to Decision-Making"** will be hosted by the University of New Mexico in Albuquerque from May 31 to June 3, 1997. *For further information*, contact: John P. Gluck, Department of Psychology, University of New Mexico, Albuquerque, NM 87131. Tel: 505-277-3420; fax: 505-277-1394; e-mail: jgluck@unm.edu.

Education

APS and AIRO to Encourage Native Americans in Research

With support from NIH's Minority Access to Research Careers (MARC) program, APS, in collaboration with the American Indian Research Opportunities (AIRO) consortium of Montana, will work to increase interest and participation in biomedical research careers among Native American students.

AIRO is a consortium of Montana's seven Tribal Colleges and Montana State University at Bozeman. AIRO was established in 1983 and is dedicated to increasing the numbers of Native Americans entering higher education and career fields where they are significantly underrepresented. Specifically, the project, entitled "Explorations in Biomedicine," will:

- provide professional development for life science instructors at Tribal Colleges and nearby middle/high schools with an emphasis on curricular enhancement;
- increase access to educational resources for Tribal College faculty and middle/high school teachers;
- build effective working relationships between and among Tribal College faculty and students, middle/high school teachers and students, and biomedical researchers; and
- focus the activities described in this proposal on enhancing the transition of students from middle to high school, high school to Tribal College, and Tribal College to four-year institution.

A number of activities will contribute to these objectives during the course of the three-year project. First, APS physiologists will present three-day mini-symposia, designed to meet the expressed needs of faculty and students at each Tribal College. Each mini-symposium will focus on a particular topic in physiology. In addition, Tribal College faculty and middle/high school teachers from the reservations will participate in the APS Frontiers in Physiology program, completing summer research fellowships in physiology research laboratories around the country and attending the summer retreat focused on translating their research experiences into classroom activities. These summer research participants will also attend either the annual meeting of the National Association of Biology Teachers (NABT) or the APS annual meeting, Experimental Biology.

The Tribal Colleges and reservation middle and high schools utilize on-line resources extensively. As part of the Explorations project, APS researchers will engage in on-line interactive problem-solving and discussions with students, Tribal College faculty, and middle and high school teachers. Finally, travel fellowships for scientific meetings will be provided for Tribal College students expressing interest in biomedical research careers. These travel fellowships will be administered as part of the current APS-NIDDK Travel Fellowship Program.

The current project builds on APS's long-term efforts to increase the partici-

pation of minorities in physiology. The numbers of Native American students enrolled in graduate work in physiology are dismally low: between 1985 and 1992, there were only one to eight Native American students total enrolled annually in graduate work in physiology (NSF, 1994). Working with the community colleges, including those controlled by specific Native American tribes (that is, the Tribal Colleges), will be critical in encouraging Native American student interest in biomedical careers. Between 1980 and 1991, Native American enrollment in two-year colleges increased by 42%, compared with an 18% increase among Caucasian students. In Montana, the Tribal Colleges are controlled by the seven Native American tribes in the state and play an especially important role. Of the more than 2,200 Native American undergraduate students enrolled in Montana colleges and universities in 1994, nearly one-half (45%) were enrolled in one of the seven Tribal Colleges, while 44% were enrolled in state universities. Eleven percent were enrolled in private colleges.

APS members interested in participating in the mini-symposia component, hosting Tribal College faculty members or middle/high school teachers for the summer research program, or acting as a mentor for a Native American student at an APS meeting should contact the APS Education Office (tel: 301-530-7132; fax: 301-571-8305; email: educatio@ aps.faseb.org).



Applications Available

for the Frontiers in Physiology Summer Research Program

- to create ongoing relationships between scientists and teachers.
- to promote adoption of national standards for science education.

Please contact the APS Education Office 9650 Rockville Pike Bethesda, MD 20814-3991

Tel: 301-530-7132; fax: 301-571-8305; e-mail: educatio@aps.faseb.org.

Strong Presence for APS at NABT Meeting

Nearly 2,000 biology educators gathered in Charlotte, NC, October 17-19, 1996, for the annual meeting of the National Association of Biology Teachers (NABT).

According to NABT Executive Director and APS member **Wayne Carley**, "The NABT meeting is an excellent way for the members of the research community who belong to APS and other FASEB societies to share their latest discoveries with the education community and for scientists to learn how to get better involved in education. NABT especially wants to thank APS and others for their visible presence and other forms of support for our strong position advocating the use of animals in research and education."

APS had a strong presence at the meeting both on the exhibit hall floor and in workshops for teachers. At the exhibit booth, nearly 500 participants — about one-fourth of all attendees — stopped by the APS exhibit booth to register their attendance, express interest in the Frontiers in Physiology Summer Research Program, gather information on the use of animals in research and teaching (including a full color poster, "Biologists Discover Amazing Things"), learn about APS's new affiliate memberships, and accept for review a complimentary copy of *Advances in*

Physiology Education and *News in Physiological Sciences.* APS Education Officer Marsha Lakes Matyas and Project Coordinator Phyllis Edelman staffed the booth, providing attendees with information about APS membership and programs tailored to their specific needs. More than 20% of those stopping by the booth were faculty from community colleges who teach anatomy and physiology.

APS also sponsored two workshops at NABT. Matyas, along with Frontiers Advisory Board Member Ann Haley-Oliphant of Miami University, Oxford, OH, led a well-attended workshop, "Encouraging Reflection and Achievement with Biology Portfolios," that offered teachers new methods for assessing student learning and for evaluating their own teaching methods. Participants worked in small groups to reflect on methods for evaluating student performance on inquiry-based activities and shared their reflections with the group. Then, criteria and examples of student-generated portfolios were discussed. Portfolios are proving to be a highly effective assessment technique, creating motivation and pride among students and offering teachers a more in-depth view of student learning.

A second workshop, "Models for Collaboration," highlighted the materi-

als and methods developed by Frontiers in Physiology Local Action Teams (LATs), Local Outreach Teams (LOTs), and Summer Research Teachers (SRTs). Presenters included APS Education Staff member Phyllis Edelman; Ohio LAT member Mary Lightbody of Columbus, OH; '95 SRT Jeanna Pisegna of Kent, OH; and LOT Chair and APS member **Rob Carroll** of East Carolina University, Greenville, NC. Participants explored the hands-on inquiry activities in the Ohio LAT unit, *Neural Networks*.

Other former SRT Fellows at NABT included '95 SRTs Jay Sylvester of Dallas, TX, and Carol Saunders of Natchitoches, LA. Sylvester led a hands-on workshop, "A 'Sweet' Lesson on Amino Acid and Protein Structure," which was developed as a result of his work with APS member **Kristine E. Kamm** at the University of Texas Southwestern Medical Center in Dallas.

Also presenting at NABT was Charles Geach, '94 SRT, of El Paso, TX. Geach participated this past summer in the research program of the American Society of Cell Biology. Bob Melton of Oklahoma City, OK, '93 SRT, was one of several presenters at a special workshop on laboratory activities on the human nervous system. *

Frontiers Local Outreach Team Workshop Dates

Local Outreach Teams (LOTs) have scheduled workshops in nine cities for the 1996-97 school year (see following pages). Contact these persons if you are interested in participating in a workshop and/or applying to become a 1997-98 LOT leader.

San Antonio, TX: Nov. 22-23, 1996. Contact: Jeremiah T. Herlihy, Dept. of Physiology, University of Texas Health Science Center at San Antonio. *Greenville, NC:* Nov. 23, 1996. Contact: Robert G. Carroll, East Carolina University. Valhalla, NY: Nov. 23, 1996. Contact: Frank Belloni, New York Medical College. Dallas, TX: Nov. 23, 1996 and Feb. 15, 1997. Contact: Jureta Horton, University of Texas, Southwestern Medical Center at Dallas. Houston, TX: Dec. 7, 1996 and Feb. 8, 1997. Contact: Norman Weisbrodt, University of Texas Medical School. Vermillion, SD: Oct. 19, 1996 and Winter 1996-97 (date to be set). Contact: Barbara Goodman, University of South Dakota, School of Medicine. Davis, CA: Oct. 11-12, 1996. Contact: Barbara Horwitz, University of California, Davis. Boston, MA: Nov. 8, 1996. Contact: Andrea Gwosdow, Massachusetts General Hospital. Milwaukee, WI: Nov. 8-9, 1996 and Spring, 1997. Contact: Jeffrey L. Osborn, Medical College of Wisconsin.

Education



Teacher Hal Kipperman (l) and APS member Barbara Goodman execute their flow experiment.



The Boston Local Outreach Team includes teachers David Lockwood and Gertrude Sweeney and APS member Andrea Gwosdow.

APS Members Reach



Teachers Lisa Bidelspach (I) and Della Sue Webb (r) work with APS member Jureta Horton on the development of a concept map describing neural reflexes. The concept map allows teachers to assess student understanding and misconceptions about scientific concepts.

As part of the **Frontiers in Physiology program**, APS sponsors **Local Outreach Teams** (LOTs) to lead professional development workshops on physiology topics for middle and high school teachers in their local communities. LOTs are comprised of APS member physiologists, local science teachers, and other local education resource persons. Members of the nine LOTs funded for the 1996-97 school year attended a Outreach Institute to learn about the materials and techniques for conducting workshops for local teachers and to begin planning their 1996-97 workshops.



APS member Stanley Passo directs the timing of his group's flow experiment.



The San Antonio Local Outreach Team includes APS members Jeremiah Herlihy (c) and J. R. Haywood (r) and teachers (l to r) John Perez, Rajee Thyagarajan, and Rose Perez.

Education

Out to Local Teachers



APS member Norman Weisbrodt leads the Houston Local Outreach Team, along with teachers Della Sue Webb (c) and Lisa Bidelspach.



APS members Robert Carroll (left) and Stanley Passo (right center) work on their neural reflexes concept map with teachers David Lockwood (left center) and John Perez.



1996-97 Local Outreach Teams are joined by APS member Jack Wood and teachers from the Columbus, OH, Local Outreach Team. The Ohio LOT trained the new LOTs in the use of their *Neural Networks* workshop unit. Luke Haseler from the University of California at San Diego (not pictured) assisted with training on the Physiology of Fitness unit.



APS member Jack Goldberg (r) teams up with teacher Mary Lightbody to check the effects of viscosity on flow rate.

Develop a Local Outreach Team in Your Community!

Application forms are now available for 1997-98 LOT grants. Requests for proposals are available in hard copy from the Education Office via phone at 301-530-7132, by fax at 301-571-8305, or by e-mail at educatio@aps. faseb.org. **Completed applications are due February 15, 1997.**

Chapter News

Midwest Physiological Society Meeting

The first organizational meeting of the Midwest Physiological Society was held June 3 and 4, 1996, in Milwaukee, Wisconsin.

A total of 60 scientists attended the meeting, all of whom presented posters. The meeting was composed of four oral sessions with nine speakers for each session. The topics included integrative physiology, ionic mechanisms, renal physiology/hypertension, and cellular/molecular physiology. Graduate students and postdoctoral fellows presented approximately 60% of the presentations given. Eight awards were given for outstanding student presentations.

The participating universities were University of Iowa School of Medicine, University of Illinois College of Veterinary Medicine, Finch University of Health Sciences in Chicago, Northern Illinois University, University of Illinois, Mayo Clinic School of Medicine, University of Minnesota, University of Wisconsin at Milwaukee, University of Wisconsin at Madison, University of Wisconsin at LaCrosse, Marquette University, and the Medical College of Wisconsin.

The second annual meeting of the Midwest Physiological Society will be held at the Mayo Clinic and will be organized by **Joseph Szurszewski**. At that meeting, officers for the society will be elected and discussions will be held on expanding the meeting to include southern Illinois and Michigan.

APS Sustaining Associate Members

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



Abbott Laboratories Alliance Pharmaceutical Corporation American Medical Association Amgen, Inc. Astra Arcus USA, Inc. Axon Instruments, Inc. **Berlex Biosciences** Ciba-Geigy Limited Dr. Karl Thomae GmbH Genentech, Inc. Gould Instrument Systems, Inc. Grass Foundation Harvard Apparatus Hoechst Marion Roussel. Inc. Hoffmann-LaRoche Inc. Jandel Scientific Janssen Research Foundation

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NIH News

City of Medicine Award to NIEHS Director Olden

For nine years, Durham, North Carolina, the City of Medicine USA, has celebrated the accomplishments of worldrenowned medical scientists, public health professionals, and others working on the frontiers of medical discoveries. This year, one of the four recipients of the prestigious City of Medicine Award was National Institute of Environmental Health Services (NIEHS) director Kenneth Olden, a former APS Porter Fellow, who was honored for his extraordinary contributions to medicine in the public interest.

Olden's contributions and accomplishments are numerous. Olden is a highly regarded cancer researcher whose 26-year career includes appointments at Harvard University Medical School, the National Cancer Institute, and as director of the Howard University Comprehensive Cancer Center in Washington. He has published more than 200 articles on understanding and preventing the spread of cancer and has been honored as a Presidential appointee to the National Cancer Advisory Board, with a Distinguished Service Award from Health and Human Services Secretary Donna Shalala, and by membership to the Institute of Medicine of the National Academy of Sciences. Olden currently serves on the board of scientific consultants of the Memorial Sloan-Kettering Cancer Center and on the editorial boards for Cancer Research and the Journal of the National Cancer Institute.

The citation from Olden's City of Medicine Award states: "In the field of environmental medicine, Olden has established bold new agendas for NIEHS since taking the post of director in 1991 as the first African-American to head one of the 17 institutes of the National Institutes of Health. Under his leadership, NIEHS has expanded scientific efforts to identify environmental factors that cause birth defects, kidney and pulmonary dysfunctions, and other disorders as well as cancer. Dr. Olden has



National Institute of Environmental Health Services (NIEHS) director Kenneth Olden

implemented prevention and clinical programs to address environmental health concerns, such as lead poisoning, that are responsive to the needs of the American people. He has played a major role in bringing disparate groups together and in fostering interagency cooperation that has led to new initiatives to address hazardous environmental exposures."

One of Olden's greatest accomplishments was in revitalizing NIEHS itself. For a decade before Olden's tenure, the agency, located in Research Triangle Park, North Carolina, received the lowest budget increase of all the agencies at NIH. Science magazine reported in 1993 that Olden "inherited a 25-year-old organization that was perceived to be slipping in its leadership role" in environmental toxicology. Olden moved to consolidate operations at NIEHS and established a number of multidisciplinary, synergistic research programs that provided the agency with the means to meld clinical research at the preeminent medical centers in close proximity to the Research Triangle with ongoing laboratory research at NIEHS.

Despite his background as a cancer researcher, Olden has labored to rid NIEHS of its "National Cancer Institute South" reputation, an epithet the agency acquired for its previous emphasis on the identification of environmental agents that cause cancer. Upon taking over NIEHS, Olden posted a new list of priorities that included research into other disease endpoints such as birth defects, kidney and pulmonary dysfunctions, neuroendocrine disorders, and reproductive

dysfunctions. Also, the premise that environmental health risks are borne disproportionately by members of socioeconomically-disadvantaged communities has been gaining wider acceptance because of Olden's leadership. The relationship between poverty, disease burden, and environmental exposures was highlighted as an institute priority in 1991.

Since Olden's appointment to NIEHS in 1991, grant applications referred to the agency have nearly doubled, and the agency has earned the third highest increase for FY 1997 among the institutes at NIH, up 7.1% to \$308 million. (See related article on NIH funding on page 375.) Olden is also particularly proud of the accomplishments of his employees, who have been recognized with the Meritorious Presidential Rank Award, with the Secretary Health and Human Services Award, and with a Nobel Prize in Physiology or Medicine.

"Anyone who accomplishes what I am alleged to accomplish cannot do it without a first rate group of people," Olden said. "All I can do is create an environment that allows people to use their talents creatively. I have asked people to step up and be creative, and they have risen to the challenge." �

People and Places

Introducing ... John E. Hall



John E. Hall was appointed as editor of *The American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* on January 1, 1996. He previously served on the editorial board and was an associate editor from 1990-1996.

Hall is currently professor and chairman of the Department of Physiology and Biophysics at the University of Mississippi Medical Center. He received a BS from Kent State University in 1968, served in the US Army from 1968-1970, and received his PhD in physiology from Michigan State University in 1974. After postdoctoral training with Arthur Guyton at the University of Mississippi Medical Center, he was appointed as assistant professor in 1976, promoted to professor in 1982, and appointed as chairman in 1989. Hall's research has focused on neurohumoral and intrarenal mechanisms, especially the renin-angiotensin system, that control kidney function and the role of these mechanisms in circulatory regulation, especially in hypertension. His recent research has concentrated on the renal and cardiovascular consequences of obesity and insulin resistance and on the mechanisms of obesity hypertension. Hall has authored more than 300 publications and six books.

Hall has been an active member of APS since 1976, previously serving as Councillor, chairman of the Water and Electrolyte Homeostasis Section, a member of the Long-Range Planning Committee, and currently as chairman of the Section Advisory Committee. He also serves on the executive councils of several other scientific societies, including the American Heart Association Council for High Blood Pressure Research, the Inter-American Society of Hypertension, and the American Society of Hypertension, as well as on NIH study sections. In addition to his editorial activities on behalf of APS. Hall also serves on the editorial boards of several other journals, including Hypertension, Clinical and Experimental Physiology and Pharmacology, and Nutrition, Metabolism and Cardiovascular Diseases.

Hall's primary goal for the journal is to attract and publish the very best work in the fields of regulatory, integrative, and comparative physiology. He states that "our two immediate objectives are 1) to decrease the time required for review and first decision on submitted manuscripts, while maintaining high-quality fair reviews and 2) to extend the excellence and scientific impact of the journal." Together with his associate editors (C. M. Blatteis, J. P. Granger, A. K. Johnson, T. E. Lohmeier, H. Nishimura, J. E. Robillard, and D. B. Young) he has initiated several procedural changes that have expedited the review process, including centralization of the editorial offices and utilization of the fastest means of communication in assigning and reviewing the manuscripts. To enhance the scientific impact of the journal, the editors have 1) encouraged authors to articulate how their work illuminates physiological mechanisms by including a brief "Perspectives" section in the discussion of the manuscript, 2) invited increased number of reviews from outstanding scientists in selected areas, and 3) continued to solicit outstanding original work in regulatory, integrative, and comparative physiology while emphasizing a new area, developmental physiology. This area has been highlighted by a new table of contents and by inviting outstanding reviews on molecular, cellular, and integrative physiological processes of cell and organ development and differentiation.

Hall and his associate editors will continue to build on this strong foundation begun by his predecessor, **William Dantzler**. He is interested in the reactions of readers and authors to these initiatives and seeks their suggestions about ways that the journal can better serve the needs of APS. \clubsuit

Giovanni Casotti has joined the Department of Biology, West Chester University, West Chester, PA. Recently, Casotti moved to West Chester University from the Department of Physiology, University of Arizona College of Medicine, Tucson, AZ.

Having moved from the Department of Cardiovascular Biology, Rhone-Poulanc Rorer Central Research, Collegeville, PA, **Bryan F. Cox** has joined the Cardiovascular and Renal Pharmacology Department of Abbott Laboratories, Abbott Park, IL, as a Senior Group Leader.

Charles L. Cox moved from the Department of Neurology and Neurological Sciences, Stanford University Medical Center, Stanford, CA, and has joined the Department of Neurobiology and Behavior, SUNY at Stony Brook, Stony Brook, NY.

Moving to Dallas, TX, **Craig G. Crandall** has become affiliated with the Institute of Exercise and Environmental Medicine. Prior to this assignment, Crandall was with the Department of Physiology, University of Texas Health Science Center, San Antonio, TX.

Moving from the Department of Pediatrics and Physiology, Louisiana State University Medical Center, Shreveport, LA, **Karen D. Crissinger** has joined the Pediatric Gas-

People and Places

troenterology Department, Vanderbilt University, Nashville, TN.

Chris Doumen has joined the Division of Research, Alton Ochsner Medical Foundation, New Orleans, LA. Doumen was formerly with the Department of Cell and Molecular Physiology, Hershey Medical Center, Hershey, PA.

Accepting a new position in the Department of Medicine, University of California at San Diego, La Jolla, CA, **Melinda R. Dwinell** has left the Department of Comparative Biosciences, University of Wisconsin, Madison, WI.

Michael Barton Dwinell has joined the Department of Medicine, University of California at San Diego, La Jolla, CA. Prior to his new assignment, Dwinell was associated with the Department of Comparative Biosciences, University of Wisconsin, Madison, WI.

Joey C. Eisenmann has moved from the Department of Exercise Science, Northern Arizona University, Flagstaff, AZ, to the Sports Department, Michigan State University, East Lansing, MI.

John Gregory Fitz is now affiliated with the Division of Gastroenterology and Hematology, University of Colorado Health Science Center, Denver, CO. Prior to his new position, Fitz was associated with the Department of Medicine, Duke University Medical Center, Durham, NC.

Formerly associated with the University of Texas at Arlington, **Manuela Natascha Gardner** has joined the Department of Zoology, University of British Columbia, Vancouver, BC.

Timothy P. Gavin is now associated with the University of California at San Diego School of Medicine, La Jolla, CA. Before his new assignment, Gavin was affilitated with Indiana University, Bloomington, IN.

Recently joining the Department of Kinesiology, University of Maryland, College Park, MD, is **James M. Hagberg**, formerly with the Department of Preventive Cardiology, Montefiore Hospital, Pittsburgh, PA.

Gregory A. Hand has moved to the Department of Exercise Science, University of South Carolina, Columbia, SC, from the Department of Physiology, University of Texas Southwestern Medical Center, Dallas, TX.

Accepting a position with Armed Forces Radiobiology Research Institute, Bethesda, MD, **Thomas C. Herzig** recently moved from the Department of Human Biology, Chemistry, and Genetics, University of Texas Medical Branch, Galveston, TX.

Having moved from Montreal, Canada, where he was associated with Meakins Christie Lab, **B. Kayser** is now affiliated with the Department of Physiology, Centre Medical Universitaire, Switzerland.

Jason H. Mateika has joined the Department of Biobehavior Studies, Columbia University Teacher's College, New York, NY, as a research fellow. Mateika was previously a research fellow with the Department of Exercise and Sports Science, University of Arizona, Tucson, AZ.

Formerly with the Department of Geriatrics and Adult Development, Mt Sinai Medical Center, New York, NY, **Myron Miller** is now with the Levindale Hebrew Geriatric Center and Hospital, Baltimore, MD.

Myeong Jin Nam is now associated with the National Institute of Health, Division of Cancer Research, Seoul, Korea. Before moving to Korea, Nam held a position with the Department of Neurology, Kennedy Krieger Institute, Baltimore, MD.

Moving to Basel, Switzerland, **Christopher J.L. Newth** is now with Sandoz Pharma AG Preclinical Research. Prior to his new assignment, Newth was associated with Children's Hospital of Los Angeles, CA, Pediatric Intensive Care.

Anne T. Nies, a former Postdoctoral Fellow, Department of Physiology, Tufts University, Boston, MA, has returned to Germany and is now associated with the Department of Tumor Biochemistry, Division of Tumor Cell Regulation at the Cancer Research Center, Heidelberg, Germany.

Previously, **Lloyd D. Partridge** was Professor of Physiology and Biophysics, University of Tennessee, Memphis, TN. Currently, Partridge is Professor of the Department of

Biomedical Engineering, University of Memphis, Memphis, TN.

Recently, **John A. Payne** accepted a position with Loma Linda University, Riverside, CA. Previously, Payne was associated with the Department of Human Physiology, University of California at Davis.

Yuan Bo Peng is now working with the Department of Neurosurgery, Johns Hopkins University, Baltimore, MD. Before this new position, Peng was affiliated with the Marine Biomedical Institute, Galveston, TX.

K.C. Prabha is now with the Department of Physiology and Biophysics, Howard University College of Medicine, Washington, DC. Previously, Prabha was associated with the Department of Biology, University of Texas at Arlington.

Accepting a position with the Department of Biological Science, University of North Carolina at Wilmington, **Robert David Roer** was formerly associated with the Institute for Marine Biomedical Research, Wilmington, NC.

Moving from the New York University College of Dentistry, New York, NY, **James J. Sciote** has accepted a position with the Department of Orthodontics, University of Pittsburgh School of Dental Medicine, Pittsburgh, PA.

Harold H. Shlevin was formerly Vice President of Scientific and Technical Affairs, CIBA Vision Ophthalmics, Duluth, GA. Today, Shlevin is Vice President of Research and Development, Bausch and Lomb Pharmaceuticals Division, Tampa, FL.

George D. Swanson has acquired a new position with the Department of Physical Education, California State University, Chico, CA. Previous to his new assignment, Swanson was associated with the Division of Science and Health, College of the Redwoods, Eureka, CA.

M. Michael Wolfe has moved from the Gastroenterology Division, Brigham and Women's Hospital, Boston, MA, to the Section of Gastroenterology, Boston University School of Medicine, Boston Medical Center, Boston, MA.

News From Senior Physiologists

Letters to Eugene M. Renkin

Jacob J. Blum writes: "You will see that I am a little weird in that I have worked on a wide variety of subjects and, believe it or not, am continuing to do so. By chance, your letter came just as my chairman was pushing me to retire in order to make way for new appointments, and I have decided that I will become emeritus no later than September 1 and possibly earlier. I will keep my lab and office and will continue to do both a little bit of experimental work (on the effects of acute and long-term changes in osmolality on amino acid uptake and release by the parasitic protozoan Leishmania donovani) and theoretical work (on the processing of auditory input from the auditory nerve by nuclei in the lower brain stem.)

"Furthermore, I am part of a US-Israel binational grant with two mathematicians at the Technion who are doing some very elegant theoretical work on metachronal wave propagation by fields of cilia such as those that occur on ciliated protozoa and in the lung and oviduct of mammals. That is more than enough. I am looking forward to becoming emeritus, since then I will be free of teaching and of committees, and I intend to catch up on a lot of reading of literary literature that I have been postponing because I have so much scientific literature to read. I have no advice to pass on to my colleagues, except to enjoy their work and to retire while they are still able to enjoy other things as well."



Tsung-Min Lin writes: "Since my retirement from Lilly Research Laboratories in 1986, I have been a guest of the Department of Physiology in the Medical School of Indiana University. The department, under the leadership of Rodney Rhoades, has been very active in basic research on pulmonary, cardiovascular, CNS, and smooth muscle research. I have participated in the weekly journal club meetings in which the staff, the postdoctoral members, and the graduate students present their findings or review the literature published by others. Although no one in the physiology department is doing gastrointestinal 'old-fashioned' research, I have gained some basic knowledge about the phenomena I observed in whole animals. This has been my satisfaction associating with the physiology department of Indiana University.

"Although I no longer have the space or the resources to continue my own interest in gastrointestinal research, I have had the opportunity to attend the gastrointestinal research meeting at the Methodist Hospital of Indianapolis. In addition, I serve as a consultant (volunteer) in the Department of Clinical Research at Methodist. My role in these meetings has been to draw the attention of clinical investigators to the basic principles of physiology. From the research proposals for the clinical studies, I also learned the application of basic principles to clinical situations."

Letter to John R. Blinks

Robert G. Ellison writes: "Responding to your nice card and note regarding my upcoming 80th birthday on December 4, 1996, thank you very much.

"I have had a wonderful career, having spent my entire career just exceeding 40 years in academic medicine at the Medical College of Georgia. Although retired for several years, I still remain in touch with a few medical and scientific organizations, attend conferences and lectures at MCG, and do a little teaching. It is certainly a different lifestyle.

"I have many fond memories of attending the meetings of the American Physiological Society with my wonderful mentor: the late William F. Hamilton, chairman of the Department of Physiology at the Medical College of Georgia for many years, who contributed greatly to my career. I still enjoy receiving the publications of the American Physiological Society."



Career Corner

PROFESSOR AND CHAIR OF PHYSIOLOGY AND BIOPHYSICS, School of Medicine and Biomedical Sciences, State University of New York (SUNY) at Buffalo. This department has been recently formed through an amalgamation of the physiology and biophysics departments and has close ties to SUNY's major investment in structural biology. The successful candidate will have an internationally recognized record of achievement in research, as well as a commitment to professional, graduate, and undergraduate training programs for students in health-related professions. Previous administrative experience is desirable. Candidates should have a PhD, MD, DVM, DDS, or equivalent degree. Salary, laboratory space, and other resources are negotiable. Women and minority applicants are particularly encouraged to apply. Interested persons should submit curricula vitae, brief descriptions of research interests and educational interests, and the names and addresses of three references. All materials should be sent to John Hay, Chairman, Physiology/Biophysics Chair Search Committee, School of Medicine and Biomedical Sciences, SUNY at Buffalo, Box 6, 138 Farber Hall, Buffalo, NY 14214. Deadline for receipt of applications is December 31, 1996. [EOAAE]

ASSISTANT PROFESSOR. The Department of Movement and Exercise Science, Chapman University, has a tenure track assistant professor position available effective for the fall of 1997. Chapman University is an independent, comprehensive university located 30 miles south of Los Angeles in a culturally diverse community. A PhD in physiology or exercise physiology is required. Salary will be commensurate with qualifications and experience. Primary teaching responsibility will be for undergraduate courses in exercise physiology and related areas. Must have demonstrated excellence in teaching and scholarship, as well as having required commitment to advising and mentoring students. Submit cover letter; resume; evidence of qualifications, including samples of recent publications and teaching evaluations; and three letters of reference to: Penny Brush, Chair, Department of Movement and Exercise Science, Chapman University, Orange, CA 92866. Deadline is January 17, 1997. Chapman University is an equal opportunity employer, committed to providing career opportunities to all people, without regard to race, color, religion, gender, age, national origin, or disability.

NASA RESEARCH ASSOCIATE AWARDS IN SPACE BIOLOGY. The advances in the space shuttle program and development of the space station have allowed the development of space biology science that offers exceptional opportunities for research. NASA is offering research associate awards at the postdoctoral level for scientists to conduct space biology research in a university laboratory or nongovernmental research institute of your choice that can provide the necessary facilities and research environment. Projects should be in the gravitational and space biology discipline. The awards are: \$20,000 for the first year and \$22,000 for the second year. Funding will begin July 1 to October 1, 1997. US citizens and permanent resident aliens with PhD, MD, DVM, DMD, or equivalent degrees are eligible to apply. Proposals are due February 17, 1997. For information and application booklet, contact: Gerald Sonnenfeld, Department of General Surgery Research, Carolinas Medical Center, PO Box 32861, Charlotte, NC 28232 (tel: 704-355-2639; fax: 704-355-7203).

Department Head, Department of Health and Kinesiology, College of Education, Texas A&M University. The Department of Health and Kinesiology has 83 full- and part-time faculty, with 148 graduate(health education, physical education, exercise physiology, motor behavior, and sport pedagogy) and 1,200 undergraduate (teacher education, exercise technology, sports management, outdoor education, and community health) majors. The department also teaches required physical education activity classes. Extramural funding totaled \$1.8 million in the 1995-96 academic year out of an overall departmental budget of nearly \$6 million. Faculty and students excel in research, development, and publication activities (see department's web site: http:\\hlknweb. tamu.edu).

The position requires an earned doctorate, a record of scholarship and experience to qualify for full professor, and a commitment to participatory decision making. The successful candidate will be expected to contribute to excellence in graduate and undergraduate education, research, extramural funding, and professional leadership and to provide effective advocacy for the department within the university and state. Salary will be commensurate with experience and accomplishments.

The preferred appointment date is September 1, 1997; however, the date is negotiable. **The search committee will begin to review applications on February 17, 1997**, and the search will continue until the position is filled. Applications and nominations, consisting of a letter of application, curriculum vitae, and names, addresses, and telephone numbers of at least three references, should be sent to: Doug Palmer, Chair, HLKN Head Search Committee, College of Education, 158 Read, Texas A&M University, College Station, TX 77843-4243. Applications from minorities are strongly encouraged. [EOAAE]

Positions Available

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

Listservs: One of Best Features Available on Internet

Have you ever browsed a FAQ (frequently asked question listing) and seen e-mail addresses that start with listserv, listproc, or majordomo and wondered what they were? Those are listservs, one of the best things available on the Internet. A listserv is relatively simple; it is software that creates a mailing list of users. A listserv list is usually devoted to the discussion of a single, narrowly focused topic. You can find listservs on just about any topic at all; one list of lists indexes 65,410 lists.

Listservs are better than newsgroups in several respects. It is much easier to create a listserv than a newsgroup; a listserv does not require much more than a PC and an Internet account, and administering a listserv is easy to do. Compare this process to the newsgroup creation process. To create a newsgroup on Usenet, the group and topic must be discussed in news.groups and voted on, and then system administrators must carry and propagate the group. Listservs are faster. Messages travel at the speed of e-mail, whereas Usenet messages can take days or weeks to propagate. Users have to actively seek out and subscribe to a listserv, so they are more likely to be knowledgeable about and interested in the topic. Listservs are more private than newsgroups and so tend to be free of spam (off-topic commercial posts.) However, the best thing about listservs is that over time they can become a real community. Since members "know" their fellow members, the tone of messages is usually polite and respectful. This is not to say that listservs are free from argument and heated discussion - they most certainly are not - but the tone tends to be more like a professional conference than a cocktail party.

There is one respect in which newsgroups are better than listservs:

newsgroups are easy to find. Just start your newsreader, and you'll find a list of 15,000 newsgroups, more or less. Listservs are harder to find, but a couple of web sites I have found make finding them easier. My favorite is Liszt at http://www.liszt.com. Liszt organizes listservs by topic, which makes browsing much easier. If browsing does not turn up anything of interest, search Liszt's database of lists. The database is big (65,000+ lists) and fast. There is also CataList, the catalog of listservs, at http://www.lsoft.com/lists/listref.html. CataList indexes only those listservs that use its Listserv software. (I have used the term "listserv" in this article to mean any automated mailing list and the associated software. Listserv with a capital "L" is also the name of a software product used to maintain automated mailing lists. There are also listproc software and majordomo software, which do essentially the same thing. Automated mailing lists are generically called listservs with a lower-case "l".) Tile.net at http://tile.net/lists/ sorts by description, name, subject, country, and sponsoring organization. Finally, there is the smaller but extremely detailed Publicly Accessible Mailing Lists list at http://www.neosoft.com/internet/ paml/index.html.

Now that you have found a list, here are some things to remember. When you subscribe to a listserv, you get a message back from the listserv software that tells you how to change your subscription options, how to set the listserv to no-mail (useful if you're going on vacation since coming back to several hundred e-mails is not fun), and most importantly, how to unsubscribe. Keep this message! When I subscribe to a listserv, I print out the welcome message and put it in a file, so I will always have it, even if my hard drive crashes. Also, remember that joining a listserv is joining a conversation in the middle. It is always a good idea to "lurk" (read without posting) for a while to learn the culture of the group. Also, make sure you know how your mailer's "reply-to" function works: will you automatically reply to the group, or to the poster? If you send a reply to the group that was intended for the poster only, it can be very embarrassing.

One last recommendation: since listservs can generate a great deal of email, you might want to upgrade your email package. Two excellent programs are Pegasus and Eudora. Both are fullfeatured, versatile e-mail packages, but Pegasus has a big advantage over Eudora. Pegasus is freeware. If you want a set of manuals, you have to pay for them, but the program itself is free and available at http://www.pegasus.usa. com. Eudora also offers a scaled-down version of its program for free, but the full package costs \$89.99. It is available at http://www.eudora.com.

If you come upon a mailing list that you think might be of interest or if you run a listserv you would like to publicize, send me the information and I will publish it in a future edition of *The Physiologist.* In addition, I welcome interesting URLs, comments, and suggestions. Send them to me at kthompso@aps.faseb.org.

The URL for December is the home page of the Department of Physiology at the Thomas Jefferson University at http://147.140.131.44/Physhome/PH. html. I also found another useful site at http://www.acsiom.org/nsr/neuro. html. This is a full-text, searchable database containing more than 55,000 neuroscience web pages. *

National Academy Press Launches Unique Web Site

With more than 1,000 health, science, and technology books on-line now and with 4,000 more volumes to go on-line within the next year, the new National Academy Press Web site is offering a unique service to readers of nonfiction books. The National Academy Press (NAP) is the only publisher offering its books full-text on the Web; others offer sample chapters at best.

The force behind this unprecedented approach to publishing is Scott Lubeck, NAP's director. "We publish cutting edge information of interest to the general public on topics that range from how to keep kids from starting to smoke to the latest advice on protecting our environment, as well as advanced books for professionals. The Web is the perfect medium for letting a larger audience know what we have to offer and for fulfilling our goal of assisting in the free exchange of information among the scientific community. What we have found in testing our system is that while people are accessing entire books, they are only downloading portions, and many are then ordering the hard copy of the book for a more thorough and, frankly, more comfortable read," Lubeck said.

The Reading Room area of the site houses all on-line books from the National Academy of Sciences and its affiliate institutions: National Academy of Engineering, Institute of Medicine, and National Research Council. Many of these authoritative books written by world-class experts result from studies requested by the US Congress or from governing agencies. Other books are written specifically for a general audience, such as Eat for Life, a book detailing how individuals can modify their diets to prevent chronic disease, and A Positron Named Priscilla, which explains how recent scientific discoveries are already impacting our everyday lives. Specialty titles can be selected from 15 subject categories, including education, earth sciences, environmental issues, food and nutrition, and medical and health sciences. As full-text books are added on-line, they are featured in the Fresh Paint section, which also showcases books making the headlines and a listing of all the most fascinating science sites on the Web.

An image of the National Academy of Sciences building, across from the Mall in Washington, DC, greets visitors to the Web Site. Those with something other than books in mind can click on the Auditorium, where weekly there are expert guests chatting interactively. Tentatively planned topics include life on Mars, AIDS, biodiversity, and how electromagnetic fields affect health. Those searching for the link betwen art and science can click on Arts in the Academy. This area showcases the art exhibits and musical concerts at the National Academy of Sciences building.

With the ability to leaf through a book with the cursor, buying books on the Web is finally as good as standing in a bookstore, and it is just as safe. The ordering section uses encryption security. Browsers in the Bookstore will find a virtual shopping basket that tallies purchases as they go. Compared with many other bookselling Web sites, the NAP site at http://www.nap.edu includes so much information that readers cannot go wrong with their purchase. Netscape Navigator 2.0 or another frames-compatible browser is necessary to get the most out of the site. (A low bandwidth version is also available.) America Online members can reach this new site by using keyword "NAS." 💠



Book Reviews

Handbook of Physiology. Aging, Section 11

Edward J. Masoro (Editor) Bethesda, MD: Am. Physiol. Soc., 1995, 681 pp., illus., \$165.00 ISBN: 0-19-507722-9

This *Handbook* is a compendium of knowledge on the physiology of aging and treats selected topics at several levels of integration from molecular through organismic. As such, the Handbook is a valuable scientific resource of useful information on aging in mammals with a bias to understanding the human circumstance. For established investigators in the biology of aging, this resource provides a "onestop" summary of much that is known in mammalian aging. Furthermore, for established and beginning investigators alike who are new to initiating studies of aging, sections of this Handbook provide a means to be alert to methodological anomalies that often negatively affect interpretations of data from different aging models and study designs.

The editor, Edward J. Masoro, is a highly respected senior physiologist with a research career dedicated to studies of aging. He has assembled a first-rate series of authors for the 24 chapters in the *Handbook*, many of whom are recognized as leading scientists in aging research.

The *Handbook* is divided into five major parts. Part I is Masoro's overview of the historical and contemporary concepts in the biology of aging. Part II focuses on methodological issues, with four chapters on experimental design and models employing experimental animals, cell culture, and human beings. The five chapters comprising Part III describe metabolic and molecular aspects of aging, including energy utilization, carbohydrate and fat metabolism, gene expression and protein degradation, and several of the long-lived proteins. Many of the chapters in this section link the known physiological and biological changes of aging to known medical conditions that often also develop with aging, such as glucose intolerance, arthritis, and some cancers.

Part IV of the Handbook is the most extensive section with 12 chapters focusing on age-associated changes in selected organ systems and in organismic aging. Topics covered include skin, nervous system, brain function, taste and smell, endocrine, bone, cardiovascular system, respiratory system, renal function, gastrointestinal tract, immune system, and loss of integration and resiliency. Part V includes two chapters on proposed modifiers of the aging process or aging phenotype, including dietary restriction and other interventions, and exercise. The material in this part is useful in two ways. The described interventions can be used as tools to study aging, and some can also be used to delay the onset, or lower the rate of development. of the inevitable physiological impairments that develop with longevity.

As is often the case with multiauthored volumes, there is some heterogeneity in the quality and depth of writing, and in some cases the treatment is descriptive, even if there is much known at the underlying molecular and cellular levels. Because in many cases the topics covered could have a significant volume written just on their own, the treatments in these cases are necessarily shallow. However, I must confess to significant concern with the cursory treatment of the skeletal muscle system found in this Handbook. Because skeletal muscles atrophy with age, because the associated alterations in power and strength are of such profound importance for the execution of occupational work, recreational activities, and competitive sport performances, as well as for the more rudimentary performance capacity required for life's daily activities, and because of the possible connection of muscle function to falls in the older adult. I view the Handbook to be seriously flawed on the topic of the skeletal muscle system. It is inexplicable for there only to be less than one page of direct treatment of muscle in the chapter on exercise when other systems of similar or lesser physiological importance receive significantly more thorough treatments.

Overall, this *Handbook* is a useful reference volume that presents much, but not all, of the key knowledge in the physiology of aging. The editor and authors are to be congratulated for a solid contribution. The *Handbook* will be appealing to biologists, gerontologists, geriatricians, and particularly to those scientists who are relatively new to embarking on experimental work in some aspect of the aging process.

Timothy P. White Oregon State University

Books/Videos on Lives of Neuroscientists Available

In their own words the lives and discoveries of eminent senior neuroscientists have been captured and preserved in an autobiographical series from the Society for Neuroscience. The autobiographies are available in two formats: book and videotape.

Editor-in-chief Larry R. Squire has collected 17 autobiographies penned by some of the most distinguished names in neuroscience and has compiled the book *The History of Neuroscience in Autobiography, Volume One*. Subjects covered include Denise Albe-Fessand, Julius Axelrod, Peter O. Bishop, Theodore H. Bullock, Irving T. Diamond, Robert Galambos, Viktor Hamburger, Sir Alan L. Hodgkin, David H. Hubel, Herbert H. Jasper, Sir Bernard Katz, Seymour S. Kety, Benjamin Libet, Louis Sokoloff, James M. Sprague, Curt von Euler, and John Z. Young. Individual videotapes of interviews conducted by PBS personality Richard Thomas with Axelrod, Hamburger, Jasper, Kety, Bullock, Galambos, and Sokoloff are also available.

For further information on how to add this important collection to your library, please contact **the Society for Neuroscience** at 202-462-6688 or write to: Autobiographies, Society for Neuroscience, 11 Dupont Circle NW, Suite 500, Washington, DC 20036.

Book Reviews

Research Proposals: A Guide to Success (Second Edition)

Thomas E. Ogden and Israel A. Goldberg New York: Raven, 1995, 462 pp., illus., index, \$49.00 ISBN: 0-7817-0313-1

This is a very informative book about the process of preparing grant proposals for funding research in the life sciences. The focus is on NIH, since a major portion of competitively funded biomedical research is supported by NIH grants. The first author is an experienced investigator who has extensive experience as a study section member. The second author is a former senior administrator at NIH.

The book has three parts and an extensive appendix section. Part One is entitled "Beginning Grantsmanship" and in 18 chapters details the process of basic grantsmanship in the preparation of the PHS 398 application. The book is written for the research scientist from the viewpoint of the reviewer, who expects a carefully prepared application. The text is replete with step-bystep suggestions as an application for research funds is being prepared.

Part Two is "Advanced Grantsmanship" and is concerned with larger investigator-initiated grants than the customary individual programs such as the familiar RO1. After an initial chapter about site visits, there are chapters on program project grants, center grants, training grants, and construction and instrumentation grants. There is also a chapter about Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) grants. The last chapter in this section is devoted to the research programs of NSF.

Part Three is entitled "Advice for New Scientists." This section has only one chapter concerned with new faculty development. It is written primarily for young scientists beginning their research careers. It is also recommended reading for graduate students in the life sciences. Although circumspect and pragmatic, this chapter seems out of place in a book about the preparation of grant proposals.

The last section of the guide contains the appendices. Included in this part are information sources (with telephone numbers) at NIH, categorical programs of the various institutes, sample "pink" sheets, examples of illustrations submitted with proposals, human subject regulations, and references on grantsmanship.

The most important section of the book is Part One. It is devoted to the refinement of the RO1 application. In 17 chapters, after an initial chapter on sources of research support, the process of preparing a strong proposal is described in detail. The traditional investigator-initiated RO1 is described as "one of the most important NIH instruments for research support." The authors note that in 1993, 81% of grants awarded at NIH were RO1s and 80% of the total appropriation went to the funding of this grant mechanism. Details of the submission of a proposal and its assignment by the Division of Research Grants to a study section for review, as well as assignment to an institute for possible funding, are outlined. Procedures for new and competing renewal applications are given for each section of the PHS 398 proposal. The budget and its justification, biographical sketches and other support, abstract and specific aims, background and significance of the proposal, preliminary studies (or progress report, if a competing renewal), experimental design and methodology, human subjects, animal welfare, collaborators and consultants, and cited literature and appendices are all considered in detail. A chapter then follows on the frequent process of resubmission of approved but not funded proposals. It is noted that in 1993, among the proposals that were funded, 48% of new proposals were amended and 38% of competing renewals were revised. The importance of the summary statement ("pink sheet") in the revision of a proposal is well delineated in this chapter. The rebuttal process is also covered, and this interesting mechanism is discussed at length in regard to its role in the revision process.

This book covers all aspects of the preparation of research proposals. It is recommended reading for all biomedical scientists who apply for research funding from any agency. The section on basic grantsmanship is particularly useful and can stand by itself as an instruction manual.

> Thomas W. Nielsen Godfrey, Illinois

Books Received

Long-term Consequences of Early Environment Growth, Development and the Lifespan Developmental Perspective. C.J.K. Henry & S.J. Ulijaszek (Editors). Society for the Study of Human Biology Symposium 37. New York: Cambridge University Press, 1996, 253 pp., illus., index, \$54.95. ISBN: 0-521-47108-7.

Mosby's Ace the Boards: Physiology. Uwe Ackermann. St. Louis, MO: Mosby-Year Book, 1996, 286 pp., illus., index, \$28.95. ISBN: 0-8151-0054-X.

Nitric Oxide, Part B. Physiological and Pathological Processes.Methods in Enzymology, Volume 269. Lester Packer (Editor). San Diego, CA: Academic, 1996, 528 pp., illus., index, \$85.00. ISBN: 0-12-182170-6.

Nitric Oxide Synthase: Characterization and Functional Analysis. Mahin D. Maines (Editor). San Diego, CA: Academic, 1996, 354 pp., illus., index, \$89.00. ISBN: 0-12-185301-2.

Pain and Touch. Lawrence Kruger (Editor). Handbook of Perception and Cognition, Second Edition. New York: Academic, 1996, 394 pp., illus., index, \$69.95. ISBN: 0-12-426910-9.

Pathophysiology of Tachycardia-Induced Heart Failure. Francis G. Spinale (Editor). Armonk, NY: Futura, 1996, 235 pp., illus., index, \$48.00. ISBN: 0-87993-649-5.

Perception as Bayesian Inference. David C. Knill and Whitman Richards (Editors). New York: Cambridge University Press, 516 pp., illus., index, \$69.95. ISBN: 0-521-46109-X.

Physiology of Respiration. Michael P. Hlastala and Albert J. Berger. New York: Oxford University Press, 1996, 306 pp., illus., index, \$49.95. ISBN: 0-19-504434-7.

Variability in Human Fertility. Lyliane Rosetta & C.G.N. Mascie-Taylor (Editors). New York: Cambridge University Press, 1996, 225 pp., illus., index, \$54.95. ISBN: 0-521-49569-5.

Venous Thromboembolism: An Evidence-Based Atlas. Russell D. Hull, Gary E. Raskob, and Graham F. Pineo (Editors). Armonk, NY: Futura, 1996, 449 pp., illus., index, \$149.00. ISBN: 0-87993-633-9.

Physiology of Cephalopod Molluscs: Lifestyle and Performance Adaptations

Hans O. Portner, Ron K. O'Dor, and David L. Macmillan Basel, Switzerland: Gordon & Breach, 1994, 214 pp., illus., index, \$94.00 ISBN: 2-88449-027-2

This multi-authored edition is clearly an impressive collection of scientific reviews that must be considered essential reading for specialists in the area and for those with a general interest in comparative physiology. As a nonexpert in the area, I was impressed with the lucidity and consistency of the writing and with the editors' ability to maintain a consistent approach throughout.

The various segments provide a fascinating glimpse into the evolution of cephalopod molluscs, which include such common invertebrates as the squid, octopus, and the shelled nautilus. The focus on evolutionary changes and the detailed scientific studies examining the characteristics of these cephalopods that

raise their performance levels to those found in vertebrates makes this an interesting read. Even when the focus is on technical scientific issues, the general approach always allows a casual reader to glean particular gems of interest and novelty from every chapter. This edition serves as a very nice bridge between the laboratory and the field. The book opens with a consideration of the evolution of cephalopods demonstrating diverse strategies of the use and regulation of energy in creatures of substantially different design. The active lifestyle and complex behavioral strategies requiring a sophisticated central nervous system is contrasted in the more advanced species with those species representing more ancient evolution.

Issues related to adjustment of buoyancy through specific metabolic regulatory pathways and sections dealing with the sensory systems were particularly intriguing. The similarity of the eye of the octopus to that of higher species allowed for many of the early studies related to vision that have shown direct relation to higher systems. Chapters on the various organ systems are presented with sufficient detail for the expert, but the use of multiple headings and excellent illustrations throughout makes it possible for the non-expert to quickly skim to areas of interest. pH and blood gas regulation in these creatures strikes some dramatic similarities and differences from vertebrate physiology.

The breadth and depth of this text clearly make this an important publication for researchers in this and related areas. From the perspective of a book review for the general readership of the society, the fact that subject areas range from behavioral and lifestyle with an emphasis on evolutionary processes to extremely detailed studies of blood gas, intermediary metabolism, and specific organ function makes the book interesting for the general physiologist who is willing to accept that complex invertebrate lifeforms are every bit as fascinating as vertebrate lifeforms. This book provides an interesting and detailed perspective on creatures to which, as a group, very few vertebrate biologists normally give much thought.

> W. Wayne Lautt University of Manitoba

GRANT OPPORTUNITY

Through an award from NIH, the US Civilian Research & Development Foundation (CRDF) has announced a new program to support collaborative research and development projects in the biomedical and behavioral sciences.

Proposals must be submitted jointly by an American co-principal investigator and a co-principal investigator from the former Soviet Union (FSU). The American co-principal investigator must be a researcher who is currently supported by any component of NIH through either an extramural award or in an intramural program. Co-principal investigators from the former Soviet Union must be citizens and residents of one of the countries of the FSU.

Proposals may request up to \$80,000 over two years. At least 80% of total project costs must be directed towards the FSU component of the collaboration, and for-profit organizations must cost-share. The deadline for submission of Biomedical and Behavioral Science proposals to the CRDF is February 15, 1997.

Please contact CRDF to request an application packet:

Biomedical & Behavioral Sciences Program US Civilian Research & Development Foundation 1800 North Kent Street, Suite 1106 Arlington, VA 22209

Tel: 703-526-9720 Fax: 703-526-9721 E-mail: information@crdf.org Web: http://www.crdf.inter.net

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Announcements

The Physiological Society of Nigeria Needs Your Help

A.B. Ebeigbe, editor-in-chief for *The Nigerian Journal of Physiological Sciences*, has sent word his organization, the Physiological Society of Nigeria, is very much in need of assistance. Ebeigbe is asking colleagues and other agencies to donate the following materials: IBM-compatible computers (286, 386, 486); line/ink-jet printers; laser printers; photocopiers; fax machines; desktop optical scanners;

computer accessories including software; and minor office furniture. If you or your organization wishes to help, please contact Ebeigbe by fax at 234-52-600-577. All contributions are greatly appreciated. *

PRAT Fellowships for Postdoctoral Scientists at NIH

The Pharmacology Research Associate (PRAT) Program of the National Institute of General Medical Sciences (NIGMS) sponsors postdoctoral fellows conducting research at NIH in the pharmacological sciences. This can include among other areas research in signal transduction, drug metabolism, immunopharmacology, chemistry and drug design, structural biology, endocrinology, neuroscience, and clinical pharmacology. Potential fellows make an application together with an approved preceptor to the PRAT Program. Selected fellows receive a two-year appointment, salary, supplies, and travel funds from NIGMS to support research in preceptors' laboratories. Candidates should apply to the PRAT Program prior to coming to NIH. **Applications are due on or before January 1, 1997**, for fellowships starting in October of that year. Only US citizens or permanent residents are eligible. Contact the PRAT Program Assistant by phone at 301-594-3583 or by e-mail at PRAT@GM1.NIGMS.NIH.GOV to request a PRAT fact sheet and an application kit or visit the NIGMS home page at http://www.nih.gov/nigms to view the PRAT fact sheet. �

Research Fellowships for Young Scientists

The purpose of the American Association for Cancer Research (AACR) 1997 Research Fellowships in Clinical/Translational Research, sponsored by Amgen, Inc., and by Bristol-Myers Squibb Oncology, and of the AACR 1997 Research Fellowship in Basic Research is to foster meritorious clinical, translational, or basic research in the US or Canada by a young scientist currently at the postdoctoral or clinical research fellow level. Candidates must have been a fellow for at least two years but not more than five years prior to the beginning of the award year (July 1997.) Academic faculty holding the rank of assistant professor or higher, graduate or medical students, federal government employees, and employees of private industry are not eligible.

Terms: Each of the three AACR fellowships provides a one-year grant of \$30,000. Candidates must be nominated

by a member of AACR and must submit a detailed application.

Deadline: Friday, February 14, 1997.

For application information, contact: Jenny Anne Horst-Martz, American Association for Cancer Research, Public Ledger Building, Suite 816, 150 South Independence Mall West, Philadelphia, PA 19106-3483. Tel: 215-440-9300; fax: 215-440-9313; email: aacr@aol.com.

Carrico to Succeed Gray at Biophysical Society

Christine K. Carrico will become the Executive Director of the Biophysical Society on December 15, 1996, succeeding Emily M. Gray. She brings to the Society extensive experience in association management and government affairs, as well as an understanding of the needs and concerns of medical researchers.

Until recently, Carrico was the Acting Executive Director and Director of Scientific Affairs of the American Association of Pharmaceutical Scientists in Alexandria, VA. From 1979 to 1993, Carrico was involved in extramural grants administration at the National Institute of General Medical Sciences (NIGMS). She was Director of the Pharmacological Sciences Program from 1984 to 1993. Carrico received her BA in biology from Hollins College and her PhD in pharmacology from Yale University. She did her postdoctoral research at Yale University and the National Cancer Institute. Gray will become Consulting Executive Director on December 15 and will retire in March 1997 after 25 years with the Biophysical Society. The Society and its Bethesda, MD, office have grown markedly during Gray's tenure. The Society's first employee (part-time), Gray now manages a staff of six. Gray's dedicated and gracious attention to every member's needs played an important role in the growth of the Society and has endeared her to the membership. *

Scientific Meetings and Congresses



February 18-22

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

February 22-28

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

March 2-6

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

March 2-7

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

April 4-6

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

April 10-11

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

April 11-12

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

April 11-13

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

April 23-25

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

May 31-June 5

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

May 16-18

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

June 2-6

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

July 8-12

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

July 27-August 1

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

August 2-4

2nd World Conference of the International Society for Molecular Nutrition and Therapy, Winnipeg, Manitoba, Canada. *Information:* Grant N. Pierce, St. Boniface Hospital Research Centre, 351 Tache Ave., Winnipeg, Manitoba, Canada R2H 2A6. Tel: 204-235-3414; fax: 204-233-6723; e-mail: pierce@sbrc.umanitoba.ca. *September 7-11*

International Congress on Chronobiology, Paris, France. *Information*: Yvan Touitou, Service de Biochimie Medicale, 91 boulevard de l-Hopital, 75634 Paris Cedex 13 France. Tel: 33-01-40-77-96-63; fax:33-01-40-77-96-65; e-mail: touitou@ccr.jussieu.fr.

September 14-20

First International Congress of the International Society for Autonomic Neuroscience, Cairns, Australia. *Information*: Joel Bornstein, University of Melbourne, Parkville Vic 3052, Australia. Fax: 61-3-9344-5818; e-mail: joel@plexus.physiol.unimelb.edu.au.

September 17-20

AAEM 44th Annual Scientific Meeting and 20th Annual Electrodiagnostic Medicine Continuing Education Courses and Workshops, San Diego, CA. *Information*: AAEM, 21 Second Street SW, Suite 103, Rochester, MN 55902. Tel: 507-288-0100; fax: 507-288-1225; e-mail: aaem@aol.com.

September 25-28

International Sport Nutrition Conference, Williamsburg, VA. Information: Linda Bump, Human Kinetics, 1607 North Market Street, PO Box 5076, Champaign, IL 61825-5076. Tel: 800-747-5547 (extension 2239); fax: 217-351-2674; e-mail: lindab@hkusa.com.

October 2-5

Biomedical Engineering Society 1997 Annual Fall Meeting, San Diego, CA. *Information:* Department of Bioengineering, University of California at San Diego, 9500 Gilman Dr., La Jolla, CA 92093-0412. Tel: 619-822-1997; fax: 619-534-5722; e-mail: bmes97@ucsd.edu; Website: http://bmes97.ucsd.edu.