

The BIOSCI Electronic Newsgroups: Biology on the Internet

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1993 was the year that significant numbers of biologists started discovering the Internet, and the trend has accelerated this year. Previously strange-sounding terms such as USENET, Gopher, WAIS, MOO, and Mosaic are now becoming part of the search vocabulary in the biological sciences.

You have probably heard or read a lot of hype about the Internet or "information superhighway" and may have been mildly amused by metaphors such as "another roadkill on the information superhighway," possibly in reference to the experience of an unwary user.

We will try to avoid hype in this article, and, instead of waxing poetic about how the Internet has "something for everyone," we will demonstrate how thousands of biologists are using the Internet daily to exchange information and further their research.

We are the Principal Investigators on the BIOSCI Electronic Newsgroup Project, which is funded by a joint grant from the National Science Foundation, the Department of Energy, and the NIH. Our purpose is to provide free access to electronic communication forums for biologists. These forums are accessible on the Internet and adjoining networks, and, unlike the telephone or fax machine, the newsgroups

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provide the means for a scientist to communicate easily with several thousand of his/her colleagues. This is accomplished by posting a single electronic message using either electronic mail or what is known as "USENET news software." Many academic institutions provide free, unlimited Internet access to their faculty and students so if you have not taken advantage of this yet, you are truly missing a valuable opportunity.

From our vantage point, we hear about instances virtually every week where new insights on research problems were achieved through the cross-fertilization of ideas among different disciplines that came together on the network. In this respect the Internet is helping bridge the divisions caused by increasing specialization in the sciences.

Having attended APS meetings in the past, we noted that a recurrent theme from many speakers was the interdisciplinary nature of physiology. The variety of techniques used in modern physiology makes it a collaborative science by necessity. Given this premise, physiologists should love the Internet as a powerful integrating force. Electronic newsgroups make it possible for scientists from around the world to gather at their conveniences; newsgroup discussions can be joined any time that you start up your newsreading software. Time zone differences are not relevant; there is no need for everyone to gather together in a single location or at a specified time, since messages are stored until you access them. All you need do is participate in an electronic newsgroup in your field of interest when it is convenient for you. In this regard, interactions started at annual APS meetings can continue on-line the rest of the year.

BIOSCI is currently running about 50 electronic newsgroups on a variety of topics in the biological sciences. Examples include restricted-access (moderated) newsgroups for

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BIOLOGY ON THE INTERNET (continued from p. 235)

posting scientific meeting announcements, funding agency announcements, prepublication releases of research journal tables of contents, and professional society announcements. Newsgroups also exist for posting scientific job advertisements and position wanted ads. One of the most active newsgroups is dedicated to the discussion of experimental methods problems. It has become so highly regarded that excerpts from its discussions are summarized in a monthly column written by Paul Hengen from NIH in the journal *Trends in Biochemical Sciences*. Finally, BIOSCI is home to a large number of open discussion forums for a variety of research communities such as the *Arabidopsis* genome project, *Drosophila*, yeast, and others.

BIOSCI also offers assistance without charge to create new electronic newsgroups for research specialities that are not currently represented. As of this writing, there is not yet a newsgroup dedicated to physiology specifically, but we expect that will change soon.

All you need to get started is an electronic mail account. The account does not have to be directly on the Internet but must be on a computer connected to a network that can ultimately communicate with the Internet (please check with your local computer center for details). Many commercial companies are now also offering modem-dial-up Internet access for low flat monthly fees.

However, we recommend the use of electronic mail only if you intend to participate in only one or two newsgroups. The most effective means of participation in BIOSCI is via USENET news software. This software maintains newsgroup postings separately from your personal electronic mail in a common area on the computer that is accessible to all users. The software also organizes messages both by newsgroup topic and, within each newsgroup, by discussion topic. USENET news software is available for many types of computers free of charge on the Internet. Please read further below for details on how to obtain it. News software makes it extremely easy to skim through the subjects under discussion and read only what interests you personally; it is much more time-consuming to do this using electronic mail.

The list of BIOSCI newsgroups changes monthly. To retrieve the latest list and complete instructions for participating in the newsgroups, send an electronic mail message to the Internet address biosci@net.bio.net. The syntax of your message is not important; all mail set to this address is responded to automatically with a copy of the BIOSCI information sheet. If you have questions after reading this information, you can obtain personal assistance by sending e-mail to the Internet address biosci-help@net.bio.net.

We realize, of course, that many scientists are already faced with information overload, and the prospect of opening up a mulit-lane information superhighway through their laboratory/office may seem a bit much! Fortunately, there are software solutions for taming the information traffic, and BIOSCI makes use of several of these.

We use the Wide Area Information Server (WAIS) software, available for free on the Internet, for indexing all words in all postings to the newsgroups. This software allows users to browse at their convenience through the topics of discussion on the network instead of having to read the newsgroups religiously to keep up. WAIS is also used to index our journal table of contents postings and to maintain an address/research interest database of biologists on the network. All WAIS indexes are updated nightly on our computer, which is named net.bio.net.

The WAIS indexes and BIOSCI message archives can be accessed and searched through the information retrieval program known as Gopher. Gopher can also be obtained for free on the Internet.

If you are on the "cutting edge" of the Internet and have obtained a free copy of the Mosaic software (hypertext-based network browsing tool used as an interface to the World-Wide Web), you can connect to our archives using the uniform resource locator gopher://net.bio.net/.

Please don't be intimidated by some of this jargon. Although this article is brief of necessity, details on these free software packages (available for all kinds of computers) and the BIOSCI archives and other features can be retrieved automatically by sending electronic mail to the Internet address biosci-server@net.bio.net. The Subject: line of your mail message is ignored by our e-mail server program and can be left blank. In the body of your mail message enter the command "info faq" and then send your message. You will receive a copy of the BIOSCI FAQ (Frequently Asked Questions) by return e-mail, which answers questions about Internet software and other BIOSCI and Internet topics. If you need information on getting UXENET news software at your site, please address a similar message to biosci-server@ net.bio.net but, instead of sending the "info faq" command, please send "info usenet1" to retrieve a complete list of USENET news software and sources.

We strongly encourage you to overcome any hesitations and give the network a try. Those who do will find that the Internet will become an indispensable part of their work.

Volunteers Wanted

Interested in coordinating a physiology newsgroup? Contact Martin Frank (Marty@aps.mhs.compuserve.com)

As A Matter of Opinion

The Teaching of Physiology

The question I would like to address is: Why have we seen a decline in young scientists interested in pursuing physiology as an area of research, despite its great potential and importance? I would like to consider the hypothesis that this lack of interest may be partially due to the way physiology is taught. This notion has been derived from my conversations with many young students who have difficulty believing, based on their course work in graduate and medical school, that there are unsolved problems in physiology. My hypothesis suggests that the initial academic introduction of physiology to students is leaving them with the wrong conclusion: that physiology is a science to be simply memorized, much like anatomy, since it is fully understood and documented.

It has recently been recognized that the basic teaching of science in the US needs to be reevaluated to stem the loss of trained scientists and the negative perception of science even at the elementary school level (K-6). A major hypothesis in K-6 science education is that the teaching of scientific methods and concepts is more important than rote memorization of facts such as metabolic pathways, cellular structures, hormones, and neural networks. I would suggest that a similar phenomenon may be occurring even in our graduate level teaching of physiology. That is, we overemphasize facts and give little or no insight into the remaining questions and mysteries of this still immature science. I am sure that the major reason most of us found our way into science was the challenge and satisfaction of discovering something new about a natural process. However, I believe that the way physiology is currently taught in many programs is limited to the facts resulting from the last 100 years of investigation of physiological sciences rather than emphasizing its frontiers, which far outweigh our

collective achievements to date. The basis for this conclusion is the product of this educational system, the students.

Clearly one of the sources of this problem is the remarkable amount of information that physiological sciences has generated over the last 100 years, which has placed an enormous burden on the teacher to pass on this information. It must be conveyed to the next generation for contemporary sciences to have a base to build on. However, we should also realize that a major goal of education should be the delineation of important questions that need to be addressed by this new generation of scientists and to stimulate the student to study these problems. This approach will result in a more accurate presentation of physiology as a growing and dynamic area of research rather than a field with an undefined mission and no future

Naturally, trying to teach physiology as a dynamic science is much more difficult than reciting facts, pathways, and known control mechanisms. Students generally also prefer to have cut and dried facts to assimilate. This makes their perceived function of passing exams easier. In addition, physiology is a curriculum course in many institutions with classic educational chores, making it difficult to avoid the rote memorization of past accomplishments as a goal. However, I do not believe that the lecturer or teacher should yield to these pressures to simplify and "make a good story" out of every subject covered. Regrettably, many believe that a good story for a lecture in physiology selects a problem that has been elegantly studied in the past and is now completely understood. This makes a good educational background in methods and facts as well as an easy topic to teach and present. But if every area in physiology is taught in this fashion, the student may have difficulty in seeing what problems are left to challenge

him/her in the future. Indeed, I believe this is exactly what is occurring.

Towards a solution to this problem, I would suggest devotion of a significant amount of time in our basic courses to the discussion of major unsolved research problems in physiology to stimulate the student rather than just fill him/her with facts. These research problems could most logically be presented at the end of a data dump concerning the known facts on a subject in a given lecture. Naturally, all students will not be interested in these "mysteries and puzzles"; however, these disinterested students are not necessarily the students we wish to attract to the field. Furthermore, our curricula should not be formulated based on the recommendations of a small, usually vocal group who just want to get by a given course.

Examples of physiological questions that could be presented are as varied as the number of investigators in the field. For example, after reviewing the known parameters and processes that can control blood flow (e.g., adenosine, K⁺, and endothelium-derived relaxing factor), it would be illustrative to point out that, even with this extensive knowledge, we do not know what the cytosolic control network is that balances oxygen and substrate utilization with the blood flow. An excellent example is the apparent overperfusion of an active region of the brain that results in the fascinating magnetic resonance imaging (MRI) and position emission tomography (PET) images of the local metabolic response to activity. Why and how is blood flow stimulated by this process? We do not know. Another good example of the presentation of a physiological question in the analysis of blood flow control in skeletal muscle is presented by Gorman and Sparks in the article "The Unanswered Ouestion" (News in Physiological Sciences 6: 191-193, 1991). The authors review the known facts concerning the regulation of blood flow in muscle with exercise and reach the conclusion that we do not understand this process. What we are looking for is the bright student who will be challenged by such presentations and questions.

Another area I believe we should stress is the use of new technology in the study of physiology. Many working hypotheses exist and are being tested around the world with a variety of modern techniques. These include molecular biology; transgenic animals; protein structure and chemistry; noninvasive technologies including nuclear magnetic resonance, PET, and optical spectroscopy; and sophisticated electrical analysis such as patch clamp and magnetoencephalogram to name only a few. Even though these are only tools for the study of physiology, it is important to point out that these tools are permitting us to study physiology at a whole new level. For example, if one has a hypothesis about the importance of a specific isomer of creatine kinase in muscle energetics, one can test it by producing a transgenic mouse without the enzyme or with a significant modification. If one wishes to study brain perfusion noninvasively with submillimeter resolution, new MRI techniques can provide this information with subsecond time resolution. Thus, the presentation of new technology as it applies to the study of physiology is also important if the student is to develop a

proper perspective that physiology is a growing field with new experimental tools being developed on a regular basis.

Because I have not sampled the manner of teaching used in every institution, I cannot be certain that this type of approach is not already being used or attempted, and I apologize in advance to any progressive program in this area. However, my experiences with students do suggest that many physiology courses have evolved into a series of lectures on previously "established" facts.

Every reader of this article will have a list of major physiological questions and techniques in his/her own area of research that will not appear in most textbooks or physiology courses available today. I believe that one of the critical roles of the APS is to help identify some of these major questions in the field of physiology and to help the educator who may have, regrettably, fallen into the trap described above. This list could take the form of a document or book outlining the major questions in physiological sciences to be created through the collaboration of the different sections of the APS. In addition, I would encourage more investigators to write articles concerning the questions and new technology in physiology. The editors of News in Physiological Sciences and Advances in Physiology Education should also encourage submission of more problemoriented articles to help the teacher of physiology to identify these areas. This might include articles concerning some of the major research topics in neurophysiology, renal physiology, etc., which could be blended into a standard physiology lecture series.

In summary, I suggest that we are in danger of teaching physiology as a nearly completed and descriptive science, which, as any physiologist knows, is far from the truth. The study of physiology will continue with even more excitement and power with the new technological developments occurring over the next few decades, including the complete description of the biological genome and the newly developed tools for understanding protein synthesis as well as structure and function relationships. This continued interest and work in physiology must occur, since what is left after the description of these building blocks is the discovery of how they interact to result in a physiological process. Finally, the APS should encourage the presentation of physiology as it is: a science that is truly the last frontier in the study of life.

> Robert S. Balaban Laboratory of Cardiac Energetics National Heart, Lung, and Blood Institute Bethesda, MD

Commentary

I read Balaban's letter very carefully, and I've gone over several recent textbooks in physiology. I concur completely with what I believe is the basic idea inherent in Balaban's letter. We have allowed physiology, as it is currently taught, to become entirely too static. Perhaps that has something to do with the loss of laboratory teaching. Perhaps it has something to do with the mean age of the people teaching physiology. In any case, I think his ideas are important, and I think we need to make a major effort to "vitalize" the teaching of physiology.

> Brian R. Duling President

Council

Council Meets in Bethesda, MD

Once again, the Bethesda meeting provided the APS Council with an opportunity to sample typical Washington summer weather, 90° heat and 90% humidity. The meeting, held July 15-17, 1994, marked the annual gathering of the Council to receive reports of committee activities from the committee chairs. Most of these committee reports have been published in the August 1994 issue of *The Physiologist*. In addition, the Bethesda meeting provided Council with the opportunity to talk to John Clymer, Vice President, Americans for Medical Progress Educational Foundation, to discuss the current initiatives of the animal rights movement and the status of associated legislation.

The summer meeting of Council provides the committee chairs with an opportunity to review the activities of their committees during the previous year, discuss opportunities for the future, and develop projects that can be implemented through collaborative efforts. Such interactions were apparent in the efforts of the Careers in Physiology, Education, Women in Physiology, Liaison With Industry, and Animal Care and Experimentation Committees to develop resource materials designed to assist our members in their efforts to take physiology and animal research into the precollege classroom. The APS staff member responsible for coordinating most of these efforts is Marsha Matyas.

During the meeting, Council also discussed several issues important to the future of the APS publication program. For the last several years, expenses associated with the support of the offices of editors and associate editors has increased steadily. In part, this increase has occurred because clear budgetary guidelines have not been provided to the editors. In order to rectify this situation, **Leonard Johnson** will be



L-r: Leonard S. Jefferson, William H. Dantzler, John Clymer (Vice President, Americans for Medical Progress Educational Foundation), and Brian R. Duling.

working with Brenda Rauner, Jim Liakos, and **Franklyn Knox** to develop fixed budgets for each editorial office. As an incentive for remaining within these budgets, Council approved a proposal to provide the editors and associate editors with honoraria in recognition of their efforts on behalf of the APS.

The Council also received a status report from the APS staff on efforts to publish the APS journals on CD-ROM. Bids have been received from Lancaster Press and Science Press, the printers of APS's journals, for the monthly publication of a CD-ROM disk. The monthly CD-ROM journal would contain all the APS journals in a fully searchable but not necessarily fully readable format. Readability would be a function of the user's subscription profile to the CD-ROM journal. The format for the product had been on display at Experimental Biology '94 and was well received by the attendees. However, because of the cost of the venture, the Council instructed the staff to conduct a user survey, evaluate the financial impact of CD-ROM publication on the print subscriptions, and identify an appropriate vendor by January 1995. The staff was instructed to develop by March 1995 a pricing scheme for subscriptions to the CD-ROM journal with a goal of publishing the APS journals on CD-ROM by January 1996. The Council also directed the staff to evaluate the feasibility of publishing the journals on-line.

The Council established a Task Force on Awards in response to a recommendation made by the Interim Awards Committee. The purpose of the Task Force is to review the entire APS awards structure, decide whether or not the awards are being managed appropriately by the respective committees, evaluate whether APS needs a committee for each award, determine whether there are other ways APS could fund these awards, and whether there are other awards that the APS should be presenting. The Council asked **Neil Granger** to chair the Task Force and appointed **Leonard Jefferson**, **Harvey Sparks**, **Helen Cooke**, **Mordecai Blaustein**, and **Martha O'Donnell** as members of the Task Force.

The Council approved **Diana Marver's** request to allow the Membership Committee to review applications three times a year to coincide with the Council meeting schedule and to revise their review procedures so that each committee member reviews half the applications. The change in procedure was necessitated by the anticipated increase in applications resulting from the elimination of the associate and associate corresponding membership categories. Council also approved the allocation of \$200 as a donation to an effort to create a bronze bust and a donor plaque for placement in a building, named after William Natcher, on the NIH Campus.



APS Council. Back row (l-r): Franklyn Knox, Mordecai Blaustein, Leonard Johnson, and James Schafer. Middle row (l-r): Frank Powell, Jr., Diana Kunze, Neil Granger, and Heinz Valtin. Front row (l-r): Leonard Jefferson, Brian Duling, William Dantzler, and Barbara Horwitz.

Creation of the memorial is a joint effort of groups who have benefited from Natcher's dedication and devotion to support for biomedical research.

The Council also began planning for its fall retreat scheduled for November 3 and 4, 1994, following the APS Intersociety meeting on "Regulation, Integration, Adaptation: A Species Approach." Council is extremely concerned about the status of the Experimental Biology (EB) meeting and APS's participation in the meeting. This concern results from the fact that the participation of the various FASEB societies in the EB meeting between 1995 and 2000 is both variable and uncertain. Societies will come and go, and participation will decrease to as few as four societies in 1996 and 1997. As a result, there is likely to be a general reduction in the number of attendees, abstracts, and exhibits.

Council also noted that the EB meeting seems to produce only limited enthusiasm from our membership. This appears to be caused by the proliferation of specialty meetings, which provide members access to experts in various fields of research in a small group environment. In addition, there is a feeling that significant numbers of our members systematically withhold their best research from the EB meeting for presentation at specialty meetings. These negative factors are superimposed on the conviction that a generalist meeting is an increasingly important activity to maintain in the biomedical community.

Because of the above factors, Council will hold its fall retreat on the future of the APS spring meeting and on the relationship of that meeting to the EB meeting. The purpose of the retreat is to consider the issue of "meetings" in the broadest context and to attempt to formulate a rational plan for the short- and long-term benefit of the APS.

Additional details of the Council's actions during the July meeting will be communicated to the membership at the next business meeting and in *The Physiologist*.



APS Committee Chairs. Back row (l-r): Franklyn Knox, Frank Powell, Jr., Diane Marver, and Joseph Haywood. Middle row (l-r): David Brooks, Leonard Johnson, Melvyn Lieberman, and Heinz Valtin. Front row (l-r): Cheryl Heesch, Susan Gunst, Eric Feigl, and Helen Cooke.



Council Thanks APS Staff

In conjunction with the Bethesda, MD, meeting, the APS Council hosted a reception to meet the 54 staff members. **Brian Duling** thanked the staff for their service to the APS and expressed the opinion that without them the various programs and publications of the APS could not go forward. He noted that it was through their efforts that the APS has been able to prosper and be of service to the physiological research community and to our membership.

As part of the staff appreciation reception activities, Duling presented a certificate to members of the staff who had reached five-year anniversaries: Samer Masri, Circulation Manager (15 years); Jean Shao, Accounts Manager (5 years); Bola Osibodu, Editorial Secretary (5 years); Mark Goodwin, Copy Editor, American Journal of Physiology: Renal, Fluid, and Electrolyte Physiology (5 years); Virginia Bourgeois, Copy Editor, American Journal of Physiology: Cell Physiology (5 years); Amy Hoodock, Copy Editor, American Journal of Physiology: Gastrointestinal and Liver Physiology (5 years); DeShaun Proctor, Copy Editor, American Journal of Physiology: Endocrinology and Metabolism (5 years); and Paula Thoopsamoot, Accounts Clerk (5 years).

Afterwards Council thanked the staff for their efforts and expressed the hope that they would continue to serve the APS in the coming years.



Brian Duling presenting certificates of appreciation to APS staff members (l-r): Samer Masri, Virginia Bourgeois, and Mark Goodwin.



L-r: Melinda Lowy (publications), William H. Dantzler, and Nancy McClusky (publications).



L-r: David Brooks, Dorothy Arrigo (executive assistant), and D. Neil Granger.

Education

APS Receives Grant for New Education Initiative

The APS has received a grant for \$1.1 million from the National Science Foundation to support Frontiers in Physiology, a three-year project to improve science education by building connections between science teachers and the research community. The project builds on APS's highly successful Science Teacher Summer Research in Physiology program, which provides fellowships for middle and high school teachers to experience physiology research first-hand in the laboratories of APS members. Specifically, the Frontiers project will

- create ongoing working relationships between research scientists and middle/high school teachers, through research and inservice experiences, electronic mail and networks, and global communication and
- promote the adoption of national standards for K-12 content and pedagogical techniques among life sciences teachers through ongoing inservice activities developed collaboratively by teachers and researchers.

The project will address these strategies for change, not through "one-shot" interactions, but by promoting the development of long-term collegial relationships that benefit both researchers and educators. These relationships will be developed through research experience programs and a series of targeted inservice activities that span a full school year. Furthermore, the project is designed to allow the continuation of these activities as a part of the long-term activities of the APS Education Office. Operationally, the project goals will be met via two major components: 1) the Science Teacher Summer Research in Physiology Program and 2) the Joint Teacher-Researcher Physiology Inservice Program.

Summer Research Program: In 1990, the APS began a pilot program in which 10-12 high school science teachers annually received fellowships for a 10-week summer research experience in a physiology laboratory. In addition to the research experience, participants attended special sessions at the APS spring meeting, Experimental Biology, and were expected to develop classroom laboratory activities or lesson plans ("lab/lessons") based on their research experience. From 1990 to 1994, a total of 60 awards was made. The Frontiers program expands the original program in the following ways: 20 fellowships will be awarded each year; teachers will attend a one-week Summer Institute in Bethesda, MD, where they will focus on developing their laboratory experiences into classroom lessons and activities; and teachers will receive minigrants to test and revise their lessons and activities. These lessons will be reviewed, revised, and published in hard copy and via electronic publishing for dissemination to science teachers across the country. The overall goals of the Summer Research Program are to

- provide teachers with opportunities to learn about science "in action," that is, how the research process works, what research scientists do, and the intrinsic satisfaction and sense of excitement which comes from conducting research;
- facilitate teachers' transfer of knowledge acquired through the laboratory experience to their classrooms via development of classroom activities based on their research experiences;
- improve teachers' perceptions of their own professional experiences and their potential to influence student learning (that is, their science teaching self-efficacy); and
- provide support networks for teachers by developing productive working relationships between teachers and members of the research community.

Joint Teacher-Researcher Inservice Program: This project component is designed to facilitate interaction between physiology departments and the middle and high school teachers in their communities by providing materials that can be used by departments in providing inservice workshops. In the Materials Development Phase, written content and laboratory materials and a videotape for two inservice workshops for middle and high school physiology teachers will be developed by local teams of physiologists, teachers, and science education researchers. The materials developed will be tested in actual inservice workshops and in classrooms with students. The Dissemination Phase will involve 10 local dissemination teams led by APS researchers and Summer Research Teachers providing inservice programs for their local schools. Finally, the Institutionalization Phase will develop mechanisms for the program to remain an ongoing part of the overall APS education effort. The overall goals of the inservice program component are to

- connect teachers to a web of support and resources that is, to develop a learning community — at both the local level (via working relationships with local scientists) and global level (via access to Internet resources);
- increase teachers' incorporation of methods and content recommended by the National Research Council's National Science Education Standards Project in terms of content, pedagogy, and curriculum knowledge;
- improve teachers' perceptions of their potential to influence student learning (that is, their teaching self-efficacy) and the potential of their students (outcome efficacy); and

• provide support networks for teachers by developing productive working relationships between teachers and members of the research community.

Frontiers in Physiology is designed to serve as a model for other professional organizations and will provide materials and methods for inservice providers such as state science supervisors, regional education laboratories, and National Science Foundation's State and Urban Systemic Initiatives. *Information:* Marsha Matyas, APS Education Officer. Tel: 301-530-7132; e-mail: marsha@aps.mhs.compuserve.com.

Contributions Sought for New Laboratory Manual

APS members are invited to participate in the development of a nontraditional laboratory manual for undergraduate animal physiology. The manual will be an edited compendium of laboratory exercises. Course instructors will be able to select specific exercises from the laboratory manual and order custom-published laboratory manuals for their students directly from the publisher, Prentice-Hall. The goal is to allow instructors to tailor laboratory manuals that expressly fit their goals, student population, and equipment requirements without the time and effort involved in writing an in-house manual.

The project team, including APS member **Dee Silver**thorn, is seeking contributors who have written experiments suitable for undergraduate animal physiology. The team hopes to gather a wide range of experiments, from those that teach experimental design and statistical analysis with little or no equipment to complex laboratory exercises that may last several weeks and use sophisticated technology. Prentice-Hall will pay a small honorarium to each experiment author, and contributors will retain the right to continue to use their experiments in laboratory courses and in-house publications and to write about the laboratory exercise in professional journals such as *Advances in Physiology Education*.

Information: Dee Silverthorn, Department of Zoology, University of Texas, Austin, TX 78712. Tel: 512-471-6560; fax: 512-471-9651; e-mail: silverth@orange.cc.utexas.edu.

Physiologists Invited to Assist With Radio Show

The American Association for the Advancement of Science invites professional scientists and educators to volunteer as participants in the production of a science adventure series for children's radio. The show, "Kinetic City Super Crew," targeted toward 8-10 year olds, will air on radio stations across the country.

Although the characters in the show are fictional, the story lines are based on recent research and discoveries. Scientists and educators are needed to contribute to topic development, specifically providing ideas based on their own research that may be of interest to children. Professionals may also assist with script development by ensuring the accuracy and appropriateness of presented material. Finally, volunteers are needed to help in the outreach program, which will include dissemination of informational materials throughout schools and communities.

Information: Kinetic City Super Crew, Professional Participant Program, 1333 H Street, NW, Washington, DC 20005. Tel: 202-326-6647; TDD: 202-326-6630; Internet: kcsuper@aaas.org.

Future Meetings					
1995 Experimental Biology '95	April 9-13, Atlanta, GA				
APS Conference Understanding the Biological Clock: From Genetics to Physiology	July 8-12, 1995 Hanover, NH				
APS Conference New Discoveries Within the Pancreatic Polypeptide Family: Molecules to Medicine	November 8-11, 1995 Newport Beach, CA				
1996 Experimental Biology '96	April 14-18, Washington, DC				
1997 Experimental Biology '97	April 6-10, New Orleans, LA				

Meetings and Conferences

Physiology and Experimental Biology '94

Experimental Biology '94 was held April 24-28 in Anaheim, CA, and was a joint meeting of six FASEB societies (APS, ASPET, ASIP, AIN, AAI, and AAA) and several guest societies. EB '94 was organized around nine scientific themes: cardiovascular biology, cell injury, epithelial cell biology, growth and development, inflammation, metabolic processes, molecular communication and structural biology, neurobiology, and respiratory biology.

A total of 6,006 volunteered abstracts was submitted. Of this total, 2,081 papers or 35% were received from the APS membership and three guest societies, Biomedical Engineering Society, Society of Experimental Biology and Medicine, and North American Society of Biorheology. Details about abstract submission for each of the themes is included in Table 1. Of the 6,006 total abstracts, roughly one-half (2,835, or 47%) were incorporated into themes, and the other onehalf (3,171, or 53%) were presented under the auspices of the sponsoring societies. Of the 2,081 abstracts submitted to the APS, approximately two-thirds (1,339, or 64%) were presented as part of themes, whereas the other one-third (742, or 36%) was presented as part of the societal program.

Of the 2,081 abstracts processed by APS, 22% (442) were presented by female scientists as first authors and 7.5% (149) were received from institutions outside of the Americas. Government laboratories represented 5% (102) of the

abstracts received, and industry laboratories represented 17% (330). Table 2 provides information on the departmental affiliations of the first authors and indicates that 29% (578) were received from departments of physiology and 4% (82) from departments of physiology and biophysics. Authors in departments of medicine contributed 12% (240) of the abstracts.

The APS scheduled the abstracts it was responsible for programming into 41 oral, 77 poster, and 1 poster-discussion sessions. In addition, APS scheduled 31 symposia, 5 workshops, and 14 lectures. The large number of lectures resulted from the Council's decision to complement the APS's Cannon and Bowditch Award Lectures with a Distinguished Lectureship for each of the 12 sections. These Lectureships served as the focal point for the programs of each of the sections and were complemented by special sessions related to the lecture and designed to encourage interactions between students and fellows and the Distinguished Lecturer.

Attendance at the meeting was down somewhat compared with other society spring meetings. However, the scientific registration was still 9,641 (4,164 members, 3,209 nonmembers, 2,175 students, and 93 retired members). Including exhibitors and guests, the total registration in Anaheim was 12,772. Over 20% of the registrants were either members of APS or nonmembers expressing an interest in physiology.

	Theme						Abstracts					
Society	СВ	CI	EB	GD	IN	MP	ML	NB	RB	Theme	Nontheme	Total
APS	727	49	116	19	24	69	17	51	267	1,339	742	2,081
AAA	31	15	21	21	4	6	12	46	4	160	42	202
ASPET	165	34	26	10	23	19	21	42	25	365	387	752
ASIP	101	32	13	15	29	6	3	8	30	237	110	347
AIN	121	18	13	172	13	278	18	23	12	668	614	1,282
AAI	22	7	1	2	11	4	3	9	7	66	1,276	1,342
Total	1,167	155	190	239	104	382	74	179	345	2,835	3,171	6,006

Table 1. Theme and Society Designations of Volunteered Abstracts

CB, cardiovascular biology; CI, cell injury; EB, epithelial cell biology; GD, growth and development; IN, inflammation; MP, metabolic processes; ML, molecular communication and structural biology; NB, neurobiology; RB, respiratory biology.

The Experimental Biology format is an evolving one, designed to address the needs of physiologists and members of the scientific community. The "meeting within a meeting" format addresses the desires of many scientists to attend smaller meetings while providing them with exposure to a large exhibit program and placement service. With the input of the membership, future Experimental Biology meetings will be strengthened to fulfill the needs of all participants.

A number of corporate sponsors contributed to the financing of the APS portion of Experimental Biology '94. The APS gratefully acknowledges the contributions made by The Grass Foundation, Procter & Gamble Company, Clintec Technologies, SmithKline Beecham, Warner-Lambert/Parke Davis, and NIDDK.

1	able	2.	Author	Affiliations	of	Volunteered	Abstracts

Department	Number of Papers	Total
Physiology	578	29
Medicine	240	12
Biology	133	7
Pharmacology	131	7
Anesthesiology	129	7
Surgery	107	5
Cardiology	103	5
Physiology/Biophysics	82	4
Pediatrics	61	3
Biomedical Engineering	53	3
Veterinary Science	40	2
Environmental Science	25	1
Pathology	16	1
Zoology	14	1
Exercise and Sport Science	14	1
Biochemistry	12	1
Other	56	3
No department listed	193	10

GI Section Awards



Joe Fondacaro, Secretary/Treasurer of the Gastrointestinal Section, presenting the GI-Section Predoctoral Research Award to Jun Yang. Yang's abstract was entitled *The role of sequestration in m3 mACh receptor desensitation demonstrated by carboxyl-terminal mutated receptors.* She was sponsored by John A. Williams of the University of Michigan Physiology Department.



Joe Fondacaro presenting the GI-Section Postdoctoral Research Award to Michael F. Romers. Romer's abstract was entitled H^+ *cotransport is coupled to the electrogenic oligopeptide transporter*, *PEPT1*. He was sponsored by Walter F. Boron of the Yale University Department of Cellular and Molecular Physiology.

Gastrointestinal Physiology

The Gastrointestinal Physiology Section Student Prize is designed to challenge and reward students and postdoctoral fellows who are conducting their research efforts in gastrointestinal physiology. Two awards-one for work done while enrolled as a student for a doctoral degree and the other for work performed during the first through third postdoctoral years-are presented at the spring Experimental Biology meeting. Applicants must be first author on abstracts submitted for the Experimental Biology meeting, which must be accompanied by a letter from the applicant's advisor indicating whether the applicant is a graduate student or postdoctoral fellow. Each award consists of a certificate and \$300. The Steering Committee chooses a senior physiologist as the recipient of the Marion Merrell Dow in Gastrointestinal Physiology. The awardee receives \$500 and presents a lecture at the Section's annual meeting.

Liaison With Industry Committee

The Liaison With Industry Committee is currently working hard in two main areas. The first area involves encouraging physiologists working in industry to become more involved in APS and thus lead to a greater number of APS members who are employed in the industrial sector. Our efforts in this area involve encouraging submission of symposia proposals to the Committee for consideration by the Program Advisory Committee for inclusion in the Experimental Biology programs. In this area, we have been somewhat successful. At the 1994 Experimental Biology meeting in Anaheim, CA, the Committee sponsored one symposium, and the two proposals submitted for the 1995 Experimental Biology meetings in Atlanta were both accepted for inclusion in the program.

We are also initiating an effort to have a greater involvement between physiologists working in industry and the APS journals with respect to submitting and reviewing manuscripts and serving on editorial boards. We will be compiling a list of APS members working in industry along with their areas of expertise and making this list available to the editors. Members working in industry are hereby encouraged to submit to the Liaison With Industry Committee their proposals for future APS symposia and conferences and any interest in working with the APS journals. The second major focus for the Liaison With Industry Committee is to encourage high school and college students, especially minorities, to choose a career in physiology and highlight the importance of animal research. Since a number of pharmaceutical firms have current programs in place, the Committee is planning to act as a resource to help others in academia or industry set up such activities. Working with a number of other APS committees, we will compile a package of organizational plans and materials that can be used when visiting local schools.

It has been apparent to the Liaison With Industry Committee and to the APS leadership that APS members working in industry want to become more involved in APS. The main interest lies primarily at the scientific level, especially with regard to organizing APS symposia and conferences and with appointments on APS journal editorial boards. With the endeavors described above, I hope that we can indeed expand the involvement of members working in industry as well as encourage more physiologists in industry to join APS.

> David P. Brooks Chair

1994 APS Conference

Physiology of the Release and Activity of Cytokines

The 1994 APS Conference "Physiology of the Release and Activity of Cytokines" was held July 25-28 on the campus of Yale University in New Haven, CT. Chairman of the Organizing Committee was **John Stitt** of Yale University and the John B. Pierce Foundation. Additional members of the Organizing Committee included **Joseph Cannon**, Pennsylvania State University; **Gordon Duff**, The Hallam Royal Hospital, Sheffield, UK; **Matthew Kluger**, Lovelace Institute; **Alan Lewis**, Wyeth-Ayerst Research; and **Ivan Otterness**, Pfizer Central Research.

Attendees were housed either in Calhoun College dormitories or at the Holiday Inn, New Haven. Meals, included in the registration fee, enhanced discussion among attendees. Social functions included a barbecue on the first and last evenings and the conference banquet and awards presentation on Monday. The banquet speaker, author **Robert Adair** of Yale University, gave an entertaining and informative talk on



Robert Adair presenting "The Physics of Baseball" to Conference attendees.

"The Physics of Baseball," which included demonstrations of various pitches. Three graduate students were presented with awards for outstanding poster presentation, Jo Ann Dumin, Albany Medical College; Jing Fang Liao, University of Michigan; and Jennifer McClellan, University of Michigan.

Thirty-nine abstracts were submitted and programmed as poster presentations; 33% were presented by women (16% of the invited speakers were women); 10% were submitted from authors working in industry; and 10% were submitted from authors outside the Americas. Table 1 indicates the breakdown of registrants by category.

The Society gratefully acknowledges contributions received in support of this conference from NIH (NIAMS, NIAID, NICHD, NINDS, NHLBI, and NIDDK); Office of Naval Research; Pfizer, Inc.; Sandoz Pharmaceuticals Corp.; SmithKline Beecham; Synergen Inc.; and Wyeth-Ayerst Laboratories. The APS thanks the organizers and invited speakers as well as all participants who joined in making the conference a scientific success.

Table 1. Registration Categories

35	
24	
22	
9	
3	
1	
94	
	35 24 22 9 3 1 94



Organizers John Stitt and Ivan Otterness with the student award recipients at the APS Conference, New Haven.



APS Conference attendees discussing the work of a poster presenter.



Attendees discussing research presented at the Conference.

1995 APS Conference

Understanding the Biological Clock: From Genetics to Physiology

July 8-12, 1995 Dartmouth Medical School Hanover, NH

Within the past 20 years the field of biological rhythms has coalesced and moved into the mainstream of research. In metazoans the neuronal pathway of photic entrainment is generally known, and the diversity of nonphotic entrainment cues has been established. Elements linking oscillators to behavior are being identified. Anatomical and physiological studies have pinpointed dominant tissue oscillators in a number of animals, including mammals, and in several cases the oscillators have been resolved to the cellular level. This now allows a fusion of two intellectually dominant but sometimes separate lines of clock research: vertebrate physiology with invertebrate and microbiol genetics. The emergence of molecular genetics as a tool has allowed the exploitation of promising genetic groundwork that was laid in the 1960s and 1970s, with often spectacular results. Clock components are now known, and optimists predict a molecular description of an oscillator before the millennium.

Throughout the development of rhythms research as a field, a unifying principle has been belief in a comparative physiological approach. One goal of the meeting is to review the fruits of the comparative approach, both physiological and molecular, to the study of biological time and promote discussion of where chronobiology as a field has been and where it is going.

The scope will be wide, ranging from microbiol genetics to neurophysiology to human studies as they reflect on general truths. A second goal is for a select group of invited participants to assemble a reference work of lasting value concerning knowledge on biological timing as of the summer of 1995.

Organizing Committee: Jay Dunlap and Jennifer Loros, Dartmouth Medical School.

1995 APS Conference

New Discoveries in the Physiology of the Pancreatic Polypeptide Family: Molecules to Man

November 8-11, 1995 Newport Beach Marriott, CA

The pancreatic polypeptide family of peptides includes pancreatic polypeptide, neuropeptide Y, and peptide YY. There exists a great degree of diversity of actions for these peptides despite their similarities in structure and origin. These peptides appear to be able to act as classic endocrine hormones, neurotransmitters, neuromodulators, and possibly paracrines or autocrines. Adding further to the complexity of this family is the observation that there is a ubiquitous distribution of these peptides. As a consequence of these findings, it appears appropriate to consider these agents as complex regulatory peptides, affecting many biological systems, as opposed to either simply classic hormones or neurotransmitters. Thus, the study of this family of peptides incorporates science and scientists from diverse disciplines, including molecular

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and cell biologists, gastroenterologists, neurophysiologists, endocrinologists, animal physiologists, and clinical scientists. This conference is designed to bring together these various disciplines to raise consciousness of the diverse mechanisms involved in actions of these peptides and foster collaborative research efforts aimed at furthering our understanding of this unique peptide family. The conference will include plenary sessions and poster presentations. The *Call for Papers* booklet will be available in early 1995.

Organizing Committee: Chair, William Zipf, Children's Hospital, Columbus, OH; Helen J. Cooke, Ohio State Univ.; Richard Rogers, Ohio State Univ.; Ian Taylor Duke Univ.; Claes R. Wahlestedt, Cornell Univ. Med. Col.

Experimental Biology '95 Preview

April 9-13, 1995 Atlanta, Georgia

The Impact of Locomotion on Ventilation in Tetrapods

Sponsors: APS Comparative Physiology, Respiration, and Environmental & Exercise Physiology Sections. Chairs: D. F. Boggs, D. R. Carrier, and D. M. Bramble. Participants: D. Carrier, P. J. Butler, I. S. Young, D. M. Bramble, D. F. Boggs, and R. B. Banzett.

Recent studies of the dynamic mechanics of ventilation during locomotion in lizards, dogs, horses, humans, wallabies, and birds have raised several questions about the impacts of locomotion upon lung ventilation. For example, given the shared musculoskeletal elements of respiratory and locomotory systems and the inertial excursions of the viscera during running, does locomotion constrain or assist ventilation and how? are the impacts of locomotion upon ventilation significant in terms of respiratory system function or overall energetics? and what can this tell us about the evolution of lung structure, locomotory systems, and the control of breathing? New techniques such as high-speed X-ray cinematography, motionanalysis systems, and miniaturized pressure transducers along with traditional methods such as pneumotachography, electromyography, and biomechanical models are providing new information regarding the impact of locomotor cycles on ventilatory cycles. This symposium brings together biologists working on these issues from backgrounds in functional morphology, paleontology, and biomechanics as well as comparative respiratory physiology in what should be an unusual, enlightening, and controversial discussion.

Endothelin Receptors: Role in Renal Function and Dysfunction

Theme area: Cardiovascular Biology. Sponsors: APS Liaison with Industry Committee and Water & Electrolyte Homeostasis Section. Chair: D. P. Brooks. Participants: P. Nambi, M. J. Dunn, D. E. Kohan, D. P. Brooks, and A. Benigni.

A role for endothelin in both renal function and dysfunction has been suggested. The purpose of this symposium is to discuss the evidence implicating endothelin receptors in both normal and diseased kidneys. The combination of speakers for this proposed session is uniquely qualified to discuss the role of endothelin at almost every level of function. P. Nambi will present data on endothelin receptor subtype expression in both normal and diseased kidneys, and this will be followed logically by M. J. Dunn, who will discuss the signal pathways activated by endothelin receptor subtypes. Work on endothelin production and action on the renal tubule in vitro will then be presented by D. E. Kohan, followed by D. P. Brooks, who will discuss the effects of endothelin itself, endothelin peptides, and endothelin receptor antagonists on in vivo renal function. Brooks will also present work on endothelin receptor antagonists in a number of acute renal diseases. Finally, A. Benigni will discuss the role of endothelin as a key modulator of progressive renal injury. Thus, the proposed symposium will provide a comprehensive and timely discussion of the role of endothelin in renal function and potential therapeutic utility of endothelin receptor antagonists.

Osmotic Regulation of Gene Expression

Theme area: Respiratory Biology. Sponsor: APS Cell & General Physiology Section. Chair: M. B. Burg. Participants: to be announced.

An increasing number of genes with increased expression in response to hyperosmotic stress are being recognized. For some of these genes, such as those involved in accumulation of organic osmolytes or stabilization of proteins against heat shock, the adaptive advantage is apparent, but for others it is not. The normal responses to osmotic shock are basic and widespread, occurring in organisms as different as bacteria and mammals and in numerous mammalian organs, including kidney, eye, nerves, and brain. Aberrant responses may complicate pathological states such as diabetes and effects of hyper- and hyponatremia on brain cells. The purpose of the symposium is to review genes known to be affected by hyperosmolality in a number of different types of cells, with an emphasis on recent exciting studies in which the molecular mechanisms involved are being unravelled.

Hemoglobin-Based Oxygen-Carrying Solutions: Physiological Responses

Theme area: Respiratory Biology. Sponsor: APS Liaison with Industry Committee. Chair: K. E. Burhop. Participants: K. E. Burhop, J. McKenzie, D. J. Cole, A. Gulati, D. Nolte, and S. Muldoon.

A number of hemoglobin-based oxygen-carrying solutions have recently entered human clinical trials. These solutions represent a new class of resuscitation fluids that have been shown to possess a number of unique pharmacological and physiological properties. Therefore, K. E. Burhop will begin the symposium by first providing a brief overview of various clinical applications of these solutions, status of their development, safety evaluations, and some of their general properties. He will be followed by D. J. Cole and J. McKenzie, who will focus on experiments demonstrating the efficacy of these solutions in two potential clinical applications. Cole will discuss their use in the treatment of stroke (spontaneously hypertensive rat model), and McKenzie will discuss their use in treating perfusion deficits that may arise during hemorrhagic shock (swine model). These speakers will then set the stage for A. Gulati, who will begin to dissect out the mechanism of how these solutions work. He will discuss the role of endothelin, nitric oxide, and the α -adrenergic system in changes in hemodynamics and tissue and organ blood flow (as assessed with microspheres) in rats. D. Nolte will expand on this

theme by discussing the effect of these solutions on oxygenation and blood flow at the microcirculatory level. He will discuss their effect on cell-cell interaction in vivo using the technique of intravital fluorescence microscopy in both skin and muscle microcirculation. The last speaker, S. Muldoon, will go even one step farther and discuss the effects of hemoglobin solutions on vascular tissue in vitro utilizing isolated vascular ring preparations. Therefore, the symposium should provide a broad overview, from in vivo to in vitro, on the physiological and pharmacological properties of this new class of fluids and highlight some of the potential mechanisms of action of their unique physiological and pharmacological effects.

Nutrition and Exercise: Physiological Regulators of Reproductive Function?

Theme area: Metabolic Processes in Health and Disease. Sponsors: APS Endocrinology & Metabolism and Environmental & Exercise Physiology Sections. Chair: J. L. Cameron. Participants: J. L. Cameron, A. B. Loucks, D. L. Foster, G. N. Wade, and M. P. Warren.

This symposium will present and discuss recently collected data in humans and various animal species that suggest that metabolic signals provided by moderate changes in nutritional intake and exercise play an important role in governing the normal activity of the reproductive axis. It is well established that severe or chronic undernutrition and chronic vigorous exercise training can dramatically impair adult functioning of the reproductive axis as well as profoundly delay the pubertal awakening of the reproductive axis. In contrast, the question of whether moderate changes in metabolic intake and output play important roles in regulating normal adult reproductive function remains controversial and is an area of active investigation at this time. Presentations in this symposium will provide evidence in humans and other species that mild to moderate changes in nutritional intake and energy output can significantly alter the central neural drive to the reproductive axis in adulthood. In addition, the role of metabolic cues in signaling the pubertal awakening of the reproductive axis will be discussed. Possible mechanisms underlying the metabolic regulation of reproductive function will be presented, including the hypothesis that the aspect of exercise that leads to impaired reproductive function is exerciseinduced energy utilization. Last, attention will be given to the concept that some individuals (e.g., those who participate in vigorous exercise programs and/or chronically limit their food intake) may be particularly susceptible to the suppression of reproductive function by moderate changes in energy intake or output and the consequent secondary problems resulting from decreased circulating levels of reproductive hormones (e.g., changes in bone function, cardiovascular function, and susceptibility to certain forms of cancer).

Use of Transgenic Animal Models to Study Hormone Action

Theme area: Metabolic Processes in Health and Disease. Sponsors: APS Endocrinology & Metabolism and Environmental & Exercise Physiology Sections. Chair: S. A. Camper. Participants: S. A. Camper, P. L. Mellon, S. R. Ross, N. E. Cooke, K. L. Parker, and C. C. Malbon.

The construction of transgenic animals by microinjection of DNA into fertilized eggs began in 1980. Some of the earliest transgenic animals reported exhibited altered phenotypes, demonstrating that introduced genes could be expressed and have a profound effect on the physiology of the animal. In the past decade various applications of transgenic mouse technology have contributed to understanding hormone action. The results from many laboratories have demonstrated the value of transgenic mice in the study of hormonal and developmental control of gene expression in vivo. Transgenic mice have served to fill the void in cases where appropriate cell lines are not available and have been used to develop novel, readily manipulatable cell lines. Promoter and enhancer sequences have been used to overexpress or ectopically express genes, generating animal models of hyperplasia, tumorigenesis, and other disease states. In addition, transgenic mice have been used in conjunction with mouse mutants to test the efficacy of gene therapy schemes. Loss of function animal models have been generated by transgene ablation and antisense RNA approaches. The resulting phenotypes have shed light on cell-cell interactions and the lineage relationships of cells during development. Finally, by 1987 the potential to direct alterations in the genetic constitution of mice became feasible. Refinements in the technology for homologous recombination in embryonic stem cells and subsequent contribution of embryonic stem cells to the germ line of mice resulted in creation of a plethora of novel mouse strains with targeted disruptions. Whereas some of these disruptions have produced the expected phenotypes, there are numerous examples exhibiting unexpected features or no abnormalities at all, revealing a great deal about the function of individual genes. The transgenic and embryonic stem cell technologies promise to continue to expand our understanding and challenge our paradigms in hormone action.

Role of Ca²⁺ in Stimulus-Response Coupling

Theme area: Signal Transduction. Sponsors: APS Cell & General Physiology Section and Epithelial Transport Group. Chair: J. R. Dedman. Participants: H. C. Lee, J. Penniston, A. Nairn, S. Jaken, E. Kranius, M. A. Kaetzel, and C. E. Creutz.

Calcium-coupled responses to stimuli have been a topic of investigation for over a century. The identification of calcium mediators is being achieved in many physiological systems and suggests mechanisms of intracellular calcium action in initiating physiological cascades including secretion, motility, cell division, intermediary metabolism, protein synthesis, and membrane ion permeability. The understanding of calcium-coupled responses has advanced through the identification of calcium-binding proteins, determination of their subcellular localization and their physiological role through reconstitution of a cellular function, and genetic manipulation of intact cells. Many candidates for calcium-mediator proteins are currently under investigation, and it is anticipated that many more gene products involved in regulating and mediating the intracellular Ca²⁺ signal will be identified as further research continues to solve the stimulus-response coupling puzzle.

Localizing Extracellular Ion Flux With Vibrating Ion-Selective Probes

Theme area: Epithelial Cell Biology. Sponsors: APS Comparative Physiology Section and Epithelial Transport Group. Chairs: J. R. Demarest and P. J. S. Smith. Participants: P. J. S. Smith, D. Brown, J. R. Demarest, D. C. Marcus, W. Nagel, and J. C. Wright.

Direct monitoring of the defining function of transport epithelia (i.e., net transcellular ion transport) has been impossible in isolated epithelial cells, forcing the use of indirect indices of function such as oxygen consumption. Further, many epithelia present only limited surface area or are mosaics of multiple transporting cell types and, therefore, are difficult to study with conventional methods. This symposium will focus on the use of noninvasive vibrating ion-selective electrodes to measure transcellular ion flux from individual isolated epithelial cells and localized regions of intact epithelia. Participants will discuss techniques and significant new results relating to ion fluxes originating from electrically neutral as well as electrically conductive mechanisms localized to specific regions of individual cells or specific cell types in intact epithelia. The talks will illustrate the use of the technique for functional studies of a wide variety of polarized cells isolated from morphologically complex tissues such as glandular secretory cells and epithelia of great importance, but limited size, which cannot be studied with conventional isolated tissue methods. We expect this technique will be of wide interest to APS members, and its application is compatible with the simultaneous use of other techniques such as quantitative fluorescence microscopy and/or patch clamp.

Role of Cyclic ADP-Ribose in Cellular Regulations

Theme area: Signal Transduction. Sponsors: APS Renal and Cell & General Physiology Sections. Chair: T. P. Dousa. Participants: to be announced.

In the field of signal transduction, several new and exciting developments have appeared in recent years. One of the most remarkable is the discovery by H. C. Lee, who found that NAD can be enzymatically converted to hitherto unknown cyclic nucleotide, cyclic adenosine diphospho-ribose (cADPR). This newly discovered cyclic nucleotide is a specific and potent stimulus for triggering release of Ca²⁺ from the intracellular stores through the ryanodine Ca²⁺ channel, thereby regulating the Ca²⁺-induced Ca²⁺ release system. This finding shows that, in addition to now well known inositol-1,4,5-triphosphate system, another signalling pathway exists that regulates release of intracellular Ca²⁺ into cytoplasm. Moreover, it was observed that cADPR can serve as an authentic "second messenger" in the release of insulin from pancreatic B-cells in response to increased glucose in the medium. In particular, in 1993 several highly relevant studies were published that explore potential signalling role of cADPR in various types of cells and tissues, including transporting epithelia and kidney. However, among renal investigators at large, the existence of this potentially very important novel cyclic nucleotide signalling system is virtually unknown. The symposium will review and summarize the present knowledge on the cADPR system, outline fundamental principles of the system and key investigative methodologies available for the study of cADPR, and review the current information on potential regulatory role of the

cADPR system in transporting epithelia, excitable tissues, and other cell and organ types. The symposium will consist of main keynote lecture presented by Lee, discoverer of cADPR and the top world expert in this new area of investigation. He will cover general biochemical and biological characteristics of the cADPR system and the main methods of study. Lee's lecture will be followed by several specific presentations by investigators who actively contributed to and/or are currently actively engaged in research of cADPR and who will critically review the knowledge about and potential significance of cADPR in several major biological systems, including renal function and epithelial transport.

Physiology of Hyperammonemic Encephalopathy

Sponsor: APS Central Nervous System Section. Chairs: R. Hawkins and R. F. Butterworth. Participants: R. F. Butterworth, R. Hawkins, M. Norenberg, W. Raabe, and M. Robinson.

Hyperammonemia leads to brain dysfunction. This is an area of direct concern to human health that involves physiology, biochemistry, and neurochemistry. There are a variety of causes of hyperammonemia including drug toxicity, inborn errors of metabolism, and liver dysfunction or disease. With regard to health, liver disease is a very serious problem. In the US there are approximately 26,000 deaths per year as a direct consequence of chronic liver disease and cirrhosis. As the liver fails, brain function deteriorates, a disorder known as hepatic encephalopathy. This serious neuropsychiatric syndrome is characterized by neuroinhibition with symptoms that range from a gradually developing intellectual impairment to eventually stupor and coma. It has become clear that ammonia is largely responsible, and therefore knowledge of the physiology and metabolism of ammonia is of vital importance.

Oxygen Flux: Biological Consequences of Adhering to Biophysical Principles

Theme area: Respiratory Biology. Sponsors: APS Hypoxia Group and Respiration Section. Chairs: R. W. Hoyt and T. E. J. Gayeski. Participants: P. D. Wagner, D. P. Jones, R. M. Winslow, R. J. Connett, O. A. Mathieu-Costello, H. J. Green, and T. E. J. Gayeski.

The principal determinants of resistance to oxygen diffusion between blood and skeletal muscle myocytes during heavy exercise may be the regions devoid of hemoglobin and myoglobin. If this is true, significant biological consequences could accompany alterations in this space. This symposium will address evidence for and against the possibility from a broad multidisciplinary approach. Manipulations that improve peripheral conductance of oxygen appear to be associated with closer coupling between ATP demand and ATP supply in skeletal muscle. Increases in work rate are accompanied by smaller than expected changes in cell phosphorylation potential and pH and consequently less stimulation of glycolysis and less lactate accumulation. The impact of hypoxemia, anemia, exercise, volume expansion, diuresis, and supplemental oxygen carriers, as well as adaptations due to exercise training and altitude, on peripheral oxygen diffusion resistance and muscle metabolism will be discussed.

Workshop: Photorelease of Caged Compounds Applied to Physiological Systems

Theme area: Signal Transduction. Sponsor: APS Education Committee. Chair: J. H. Kaplan. Participants: J. H. Kaplan, G. Ellis-Davies, A. V. Somlyo, W. J. Lederer, and D. Ogden.

Caged compounds are stable precursors of physiologically active and important substrates that are "caged" by having essential portions of the molecular chemically modified in such a way that brief pulses of light "uncage" or photorelease the active product in the millisecond or submillisecond time domain. Molecules that have been caged include ATP, ADP, Pi, cAMP, cGMP, GTP, IP3, and neurotransmitters. In recent years, the divalent cations Ca²⁺ and Mg²⁺ have also been caged. The access to such molecules has enabled many new studies to be performed with enhanced kinetic and spatial control. Systems studied include skeletal, cardiac, and smooth muscle; ion channels in excitable and nonexcitable cells; and exocytosis in chromaffin cells. This workshop will address the practical considerations involved in using such approaches through introducing the audience to the advantages and limitations of the strategies and through discussions of what has been achieved already in an array of physiological systems.

New Developments in Mechanisms of Regulation of Cerebral Circulation

Theme area: Cardiovascular Biology. Sponsors: APS Cardiovascular and Central Nervous System Sections. Chair: H. A. Kontos. Participants: D. R. Harder, J. A. Bevan, J. E. Beckman, M. A. Moskowitz, and F. M. Faraci.

Recent advances in vascular biology have revolutionized our understanding of the mechanisms of regulation of the cerebral circulation. Discoverics of new mechanisms such as the synthesis and release of nitric oxide and related agents, the discovery of flow-dependent dilation, and the understanding of the effects of ion channels on vascular tone have shown these processes to be important in the regulation of cerebral vascular tone. As a result of these advances, established concepts about the regulation of the cerebral circulation have been challenged and new ideas have been introduced. The discussion of these new concepts and advances would be of interest to all those interested in the regulation of the cerebral circulation. These new concepts are also important in understanding pathophysiological processes involved in a variety of mechanisms including hypertension, ischemia, and stroke.

Role of Mesangial Cell Ion Transport in Glomerular Physiology and Disease

Theme area: Epithelial Cell Biology. Sponsors: APS Epithelial Transport Group and Renal and Water & Electrolyte Homeostasis Sections. Chairs: B. N. Ling and S. C. Sansom. Participants: B. N. Ling, J. V. Bonventure, K. L. Skorecki, K. Kurokawa, and S. C. Sansom.

Glomerular mesangial cell ion transport plays an integral role in many physiological and pathological responses including mesangial contraction, growth, and matrix accumulation. Binding of both vasoactive hormones and growth factors to mesangial cell receptors stimulates an increase in cytosolic Ca²⁺. This process involves both the release of intracellular Ca²⁺ stores and extracellular Ca²⁺ entry via both voltage-activated Ca²⁺ channels and receptor-operated Ca²⁺ channels. This symposium will present some of the latest data on mesangial cell ion transport and its role in both normal glomerular physiology and the pathogenesis of glomerular disease. We will begin with discussions of Ca²⁺-related signalling pathways, including phospholipase A2. This will be followed by presentations on mesangial cell ion channel regulation by vasoactive peptides. We will conclude with a discussion of mesangial cell ion transport mechanisms in the pathogenesis of diabetic glomerular diseases. Diabetic nephropathy is a major cause of morbidity and mortality in diabetic patients and is the most common cause of renal failure in the US. The participants represent a diverse group of scientists and clinicians with particular expertise in mesangial cell signal transduction. We believe that this should be an intriguing symposium for the members of Experimental Biology '95 interested in mesangial cell signal transduction, ion transport, and pathophysiology.

Oxygen Metabolism, Gene Expression, and Cellular Function

Theme area: Respiratory Biology. Sponsor: APS Respiration Section. Chairs: L. Clerch and D. Massaro. Participants: B. Fanburg, L. Clerch, D. Massaro, E. Cadenas, Y.-S. Ho, and S. Marklund.

Cellular and tissue damage produced by metabolites of oxygen are important causes of physiological dysfunction in tissues including the lung, heart, brain, and kidney. Respiring organisms have evolved many defenses against oxygen metabolites among which the antioxidant enzymes are probably the most important. This symposium will integrate questions of how antioxidant enzyme gene expression is regulated to respond to oxidant stress, how gene expression is regulated to meet site-specific changes in oxygen metabolite production, what signal transduction systems are involved in antioxidant enzyme gene regulation, what the nonharmful physiological functions of oxygen metabolites are, and, finally, what the function of the rather recently discovered extracellular superoxide dismutase is.

Estrogenic Regulation of Vascular Function

Theme area: Cardiovascular Biology. Sponsor: APS Cardiovascular Section. Chairs: V. M. Miller and L. A. Fitzpatrick. Participants: H. W. Schnaper, D. G. Harrison, D. Losordo, V. M. Miller, M. T. Nelson, and L. A. Fitzpatrick.

Epidemiological studies in humans indicate differences in development of cardiovascular disease between premenopausal women, postmenopausal women, and aged matched men. Therefore, differences in sex steroid hormonal status in general and estrogen status in particular may be causal in development of occlusive cardiovascular disease. It is known that estrogen may influence lipid metabolism and therefore may modulate serum lipids, which are important risk factors in the development of cardiovascular disease. However, new evidence is beginning to emerge to suggest that estrogens may have other genomic actions that limit development of cardiovascular discasc. This symposium will provide state-of-the-art information of molecular actions of sex steroid hormones in cardiovascular function including regulation of cell differentiation and angiogenesis; production of the endothelium-derived factors nitric oxide and the endothelins; and expression of estrogen receptors, ion channels, and matrix proteins in vascular smooth muscle. This symposium is one of the first to address hormonal regulation of cardiovascular function. The speakers are from diverse backgrounds but with common interests. They were chosen deliberately to cover a broad approach to the subject and the diverse audience who attend the Experimental Biology meetings. The speakers were considered relative to their scientific expertise. This symposium should therefore provide a starting point for future symposia on more specific topics.

Nitric Oxide Control of Renal Vascular and Tubular Interactions

Sponsors: APS Renal Physiology and Water & Electrolyte Homeostasis Sections. *Chairs:* L. G. Navar and J. P. Granger. *Participants:* to be announced.

Renal vascular and tubular interactions play an integral role in the regulation of extracellular fluid volume and arterial pressure. Despite this important role, factors involved in controlling or modulating the interaction between renal vascular and tubular function have not yet been fully elucidated. It is now evident that the kidney has the ability to produce a variety of substances that could have an important impact on the regulation of renal hemodynamic and tubular function. One of these substances, nitric oxide, has been shown to be produced not only by endothelial cells but also by renal tubular cells such as the macula densa cells. The importance of nitric oxide in the regulation of renal vascular and tubular interactions, however, is unclear. The purpose of this symposium is to present some of the latest evidence regarding the possible role of nitric oxide in the regulation of renal vascular and tubular interactions. The symposium will begin with an overview of the evidence supporting a role for nitric oxide in modulating important renal hemodynamic control systems such as the renin-angiotensin system, tubuloglomerular feedback, and myogenic mechanisms. This will be followed by presentations on how endothelium-derived nitric oxide could impact on tubular function via direct and indirect mechanisms. Finally, an overview of the significance of nitric oxide and renal vascular and tubular interactions in pathophysiological states such as hypertension will be presented.

Role of Myosin Isoforms in Smooth Muscle Function

Theme area: Cardiovascular Biology. Sponsor: APS MyoBio Group. Chair: R. J. Paul. Participants: to be announced.

Although the biochemistry and function of myosin isoforms in striated muscle have long histories, unambiguous evidence for the existence and possible significance of smooth muscle has become available only in the past few years. Recently there has been rapid advances made with the application of molecular biology techniques and novel expression systems such as motility assays. This symposium will focus on smooth muscle isoforms and the key question of what the functional consequences of changes in isoform distribution are. A central controversy is whether, as in striated muscle, isoforms are related to alterations in myosin ATPase activity and concomitant changes in velocity and energetics. In striated muscle, changes in myosin isoforms are associated with a two- to threefold change in these parameters. In contrast, smooth muscle shows a much larger dynamic range, up to 40-fold, and the extent to which this is attributable to myosin isoforms is unknown.

Cardiovascular-Renal Adaptations to Aging

Theme area: Cardiovascular Biology. Sponsors: APS Water & Electrolyte Homeostasis and Cardiovascular Sections. Chairs: J. F. Reckelhoff and E. G. Lakatta. Participants: E. G. Lakatta, C. Baylis, J. F. Reckelhoff, H. Vlassara, and V. Cristofalo.

Aging is an important health issue for the 21st century that will affect each of us individually and as a society. Many changes occur in the cardiovascular and renal systems as a result of normal aging. The mechanisms responsible for these age-related changes are not completely understood. This symposium will focus on the adaptations to aging made by the cardiovascular-renal systems and on the possible mechanisms that may be responsible for these changes. The topics covered will range from genetic mechanisms important in cellular senescence to studies in experimental animals and humans that focus on the mechanisms responsible for age-related renal and cardiovascular changes. The speakers have made considerable contributions to our understanding of aging in their particular fields and have identified and studied mechanisms that may be responsible for, or at least contribute to, age-related changes.

Workshop: Active Learning in Large Class Settings

Sponsor: APS Teaching of Physiology Section. Chairs: D. R. Richardson and R. G. Carroll. Participants: D. R. Richardson, H. I. Modell, P. Hudson, D. U. Silverthorn, and R. G. Carroll.

Science education is in the process of shifting from the mastery of a large body of factual information to an emphasis on the development of reasoning skills and the solving of practical problems. Such skills are best developed by instructors and students working together in an active learning environment as opposed to instructors and students being, respectively, sources and sinks of factual knowledge. Most models of active learning are geared towards small group settings (fewer than 15) where interactions between students and instructor are optimized. However, basic courses in physiology are often forced to meet in large classes where it is more difficult to use active learning methods. The objective of this workshop is to exchange information and ideas that will foster active learning in the large class setting. The panelists of this workshop will demonstrate their use of active learning in the large classroom setting, including advantages and disadvantages of their methods. Following this, the panelists and audience will interact in small workgroups where all will have an opportunity to share experiences and ideas in active learning and directly participate in microteaching sessions. The entire group will then reconvene for debriefing of the workshop sessions and concluding remarks.

Proinflammatory and Anti-Inflammatory Peptides

Theme area: Respiratory Biology. Sponsor: APS Respiration Section. Chairs: S. I. Said and E. T. Wei. Participants: E. T. Wei, H. A. Thomas, J. M. Lipton, D. M. McDonald, D. C. Regoli, C. A. Maggi, D. K. Das, and S. I. Said.

This symposium will focus on the role of certain neuropeptides in promoting or antagonizing inflammation, especially in the lung and airways. The importance of substance P and other tachykinins in mediating airway hyperreactivity and inflammation has been increasingly recognized in recent years. Selective tachykinin receptor antagonists have greatly expanded our knowledge of the physiology of these neuropeptides and their possible role in asthma and other inflammatory conditions. On the other hand, anti-inflammatory properties of other peptides, including vasoactive intestinal peptide, corticotropin-releasing factor, mystixins, and melanocyte-stimulating hormone, are less widely known. These peptides represent a novel group of endogenous anti-inflammatory agents, the physiological significance and pharmacological uses of which remain largely unexplored. The multidisciplinary presentations and discussions at this symposium by leaders and pioneers in the field will review present knowledge, suggest new directions for research, and emphasize potential therapeutic applications.

Urea Transporters: Genetic and Physiological Regulation in Kidney, Erythrocytes, and Vasculature

Theme area: Epithelial Cell Biology. Sponsors: APS Renal and Cell & General Physiology Sections. Chair: J. M. Sands. Participants: R. B. Gunn, T. L. Pallonc, J. M. Sands, M. A. Hediger, and M. A. Knepper.

Urea plays a critical role in the production of concentrated urine. Physiological studies in kidney collecting ducts and erythrocytes have provided evidence that urea is transported by a specific urea transport protein. Recently, a vasopressin-regulated urea transporter cDNA was cloned from kidney medulla. This urea transporter may represent the first member of a family of urea transporters, since physiological studies suggest the existence of other urea transport processes. Therefore, this symposium will present the latest information regarding the molecular basis and physiological regulation of urea transport. The symposium will include presentations on the characteristics of urea transport in erythrocytes and whether the Kidd antigen is the erythrocyte urea transporter, urea transport in renal medullary microvasculature, urea transport across the collecting duct and evidence for active urea transport, and cloning and regulation of the vasopressin-regulated urea transporter in kidney. The symposium will conclude with a presentation concerning the impact of this new data regarding urea transport upon the urinary concentrating mechanism.

Cellular and Molecular Signals Governing Energy Transduction During Exercise

Theme area: Metabolic Processes in Health and Disease. Sponsors: APS Environmental & Exercise Physiology and Cardiovascular Sections. *Chair:* S. S. Segal. *Participants:* A. J. Fuglevand, G. I. Schulman, D. A. Essig, D. A. Williams, and M. C. Hogan.

The goal of this symposium is to integrate three fundamental components of exercise: muscular contraction, substrate turnover, and vascular supply. The focus will be on events that occur primarily within skeletal muscle. Speakers will emphasize the interaction between the activity of muscle fibers, the utilization of substrate for energy supply, and the local control of muscle blood flow. Fundamental relationships to be addressed include the nature of muscle fiber and motor unit recruitment, the metabolic signals that regulate glycogen turnover and carbohydrate utilization in exercising humans, the coordination of respiratory capacity with energy demand both acutely and as an adaptive response, the origin and action of chemical and physical signals that govern capillary exchange, and the determinants of oxygen transport from the circulation to respiring mitochondria within muscle fibers. This breadth of topics has been oriented to the specific aim of conveying a comprehensive picture of the interplay among systems that results in the generation of sustained movement.

Molecular Physiology of Gap Junction Channels

Theme area: Epithelial Cell Biology. Sponsors: APS Cell & General Physiology and Central Nervous System Sections and Epithelial Transport Group. Chair: D. C. Spray. Participants: D. C. Spray, E. Winterhager, D. P. Paul, P. B. Brink, G. Dahl, and P. Meda.

Cloning and sequencing of cDNAs encoding gap junction proteins (connexins) have allowed analysis of tissue- and stage-specific patterns of expression as well as manipulation of expression of both wild type and mutant connexin proteins. These studies reveal that the dozen rodent connexins have different biophysical properties such as unitary conductance and permeability/selectivity, are differentially sensitive to various gating stimuli, and couple to one another with variable affinity. Moreover, the physiological roles of gap junction channels are being revealed through both genetic and epigenetic human diseases ascribed to aberrant gap junction expression and through animal models generated by genetic manipulation. This symposium will bring together physiological insights achieved through use of molecular techniques and is expected to result in novel appreciation of the roles of gap junction channels in normal and pathological tissue function.

Function, Characteristics, and Regulation of Volume-Sensitive Ion Channels

Theme area: Epithelial Cell Biology. Sponsors: APS Epithelial Transport Group and Cell & General Physiology, Water & Electrolyte Homeostasis, and Renal Physiology Sections. Chair: K. Strange. Participants: H. Sackin, S. Sukharev, H. Cantiello, K. Strange, M. Paulmichl, and D. Nelson.

Substantial progress has been made in the past decade on understanding the membrane transport mechanisms responsible for regulating cell volume in the face of both anisotonic and isotonic volume challenges. Little is known, however, about how cells "sense" volume changes and transduce those volume signals into regulatory responses. The purpose of this symposium is to bring together a diverse group of scientists who are working on various aspects of volume-sensitive ion channels and provide an up to date summary on our current understanding of volume sensing as it pertains to channel function.

Molecular and Physiological Basis of Neural, Pigmentary, and Immunomodulatory Actions of Melanocortins

Sponsors: APS Endocrinology & Metabolism and Central Nervous System Sections. Chair: J. B. Tatro. Participants: to be announced.

The melanocortins comprise a group of homologous endogenous peptides derived from proopiocortin in the pituitary and in a specific neuronal system in the brain. A family of G protein-associated, tissue-specific central and peripheral melanocortin receptor subtypes having unique properties has recently been identified by molecular cloning. This and other breakthroughs have created exciting new avenues to explore the diverse and complex integrative functions of the peptides as regulators of brain functions, neuroimmune interactions, pigmentation, and cancer cell growth. Using the melanocortin system as a model, this symposium will assess the extent to which the integrated function of a neural and endocrine regulatory transmitter system can be explained in terms of structurefunction relationships at each of several levels of biological organization: peptide chemistry, receptor molecular biology and pharmacology, neuroanatomy, and physiology. Individual speakers will address how the anatomic organization of the hormonal and neural elements and their respective cellular targets position the system uniquely for its pleiotropic modulatory and integrative functions, the roles of different structural motifs of receptors as determinants of differential messenger recognition and signal transduction, naturally occurring structural mutations of receptors as the molecular basis of differential patterns of skin pigmentation, the prospects for design and delivery of receptor subclass-specific drugs and anticancer agents, and neuroimmunomodulatory roles of melanocortins. The symposium is intended to develop an integrated context, demonstrating the relationship of structure to function at each level of organization, and illustrating the coordinated interaction of these principles in the overall design of the physiological system and in the prospects for the development of future generations of highly specific neuromodulatory or anticancer drugs. This will be a highly interdisciplinary forum of interest to physiologists, endocrinologists, neurobiologists, pharmacologists, immunologists, anatomists, biochemists, and molecular biologists interested in signalling mechanisms, integrative roles, and therapeutic relevance of neuropeptide receptors.

CNS Control of Respiration: Role of GABA and EAA

Theme area: Respiratory Biology. Sponsors: APS Respiration and Central Nervous System Sections. Chairs: A. M. Taviera da Silva and N. S. Cherniack. Participants: A. Guidotti, J. L. Feldman, D. F. Speck, H. Kazemi, R. A. Gillis, N. H. Edelman, and N. S. Cherniack.

The objective of this symposium is to review the role of γ -aminobutyric acid (GABA) and excitatory amino acids (EAA) in the central nervous system (CNS) control of respiration. The mecha-

nisms of respiratory rhythm generation and the brain sites where this rhythm is produced will be discussed. The neurobiology and pharmacology of GABA and EAA receptors and the role of these neurotransmitters in the generation of respiratory rhythm and pattern will be reviewed. The role of GABA and EAA in the modulation of chemosensitive responses and respiratory activity during hypoxia will also be discussed. This symposium brings together investigators from institutions where important work related to the CNS control of respiration and the roles of GABA and EAA is being conducted. The program will provide the audience with a state of the art review progress made in this field and foster new ideas for research in this area.

A Perspective on the History of Exercise Physiology

Theme area: Metabolic Processes in Health and Disease. Sponsors: APS History of Physiology Group and Environmental & Exercise Physiology Section. Chair: C. M. Tipton. Participants: S. M. Tenney, C. R. Taylor, P.-O. Åstrand, and C. M. Tipton.

At the present time there are numerous courses, texts, chapters, and reviews devoted to exercise physiology. In addition, there are journals that publish original research in this area. Unfortunately, there are few records that provide a historical perspective of this field and its evolution. Therefore, the primary goal of this symposium is to selectively examine this subject in some detail. After an overview, S. M. Tenney will discuss the individuals and their contributions before Harvey and after the respiratory experiments of Lavosier. Tenney will be followed by C. R. Taylor, who will highlight investigators who have conducted creative animal experiments that have provided the foundation for various concepts being emphasized in the field. His presentation will include, but will not be limited to, the metabolic studies of Zuntz or the sympathectomy studies of Cannon or Donald. Then P.-O. Åstrand will discuss the European influences and will include the impact of Krogh, Hansen, Christensen, Asmussen, Hill, Lupton, and others. The last speaker will be C. M. Tipton, who will cover the North American developments starting with the Harvard influences before Dill and ending with PhD and postdoctoral programs that emphasize exercise physiology.

Neural and Neuroendocrine Regulation of Cardiovascular Function: Role of the Forebrain

Theme area: Neurobiology. Sponsors: APS Central Nervous System and Cardiovascular Section. Chairs: M. L. Blair and L. D. Van de Kar. Participants: L. Renaud, M. L. Blair, B. Bohus, L. D. Van de Kar, J. A. DiMicco, and A. K. Johnson.

The brain controls cardiovascular function by acting through the autonomic nervous system. The brain also exerts long-term regulatory effects on blood volume and blood pressure via neuroendocrine mechanisms such as the renin-angiotensin-aldosterone system and vasopressin, by controlling fluid intake, and by modulating sodium excretion. All of these regulatory mechanisms can be altered by exposure to stressful conditions. This symposium focuses on the role of forebrain structures, particularly the hypothalamus and amygdala, in the control of cardiovascular function. The presentations address two interrelated aspects of cardiovascular regulation, homeostatic regulation of the renin-angiotensin system and vasopressin, blood pressure, and fluid and electrolyte balance and the influence of behavioral stress on blood pressure, heart rate, and renin release.

Intracellular Transport of Lipids and Inorganic Ions

Sponsor: APS Gastrointestinal Physiology Section. Chair: R. A. Weisiger. Participants: J. Crawford, J. Storch, W. D. Stein, K. Luby-Phelps, F. Bronner, and R. A. Weisiger.

Recent studies indicate that the structure and function of cytoplasm has a profound influence on the distribution and movement of molecules within cells. For lipids and certain inorganic ions, specialized cytoplasmic carrier mechanisms involving soluble binding proteins exist to mediate movement from one cell pole to the other. In many cases, cytoplasmic transport may be the rate-limiting step in the transport of small molecules across epithelia. This symposium will outline our current understanding of cytoplasmic transport mechanisms, including the role of cytoplasmic binding proteins, cytoplasmic membranes, and cytoskeletal structures. Experimental and theoretical data supporting the presence of concentration gradients within cells will be discussed. Emphasis will be placed on newly developed techniques for investigating this rapidly evolving field.

Mechanisms of Water Flow Across Biological Membranes

Theme area: Epithelial Cell Biology. Sponsor: APS Epithelial Transport Group. Chair: M. L. Zeidel. Participants: M. L. Zeidel, P. Agre, F. Marumo, H. W. Harris, and M. A. Knepper.

Depending on their functions, epithelia may exhibit high or low permeabilities to water, and epithelial water permeability is determined by the properties of the apical plasma membrane. In many epithelia that serve a barrier function, such as the mammalian bladder, stomach, renal thick ascending limb of Henle, and the toad urinary bladder and mammalian collecting duct in the absence of vasopressin, the apical plasma membrane exhibits an exceptionally low water permeability. By contrast, in mammalian red blood cells and epithelia such as the renal proximal tubule, thin descending limb, and the collecting duct in the presence of vasopressin, water permeability is exceptionally high because of the activity of specialized water channels. Recent developments have permitted explosive growth in our understanding of the mechanisms of water flow across membranes, and this symposium will review our current understanding of this field. M. L. Zeidel will describe our current understanding of mechanisms that permit biological membranes to exhibit strikingly low water permeability. P. Agre will describe the discovery and cloning of the aquaporin family of water channels, which are present in red blood cells as well as renal proximal tubule and the thin descending limb, with particular emphasis on the relationships between their structure and function. F. Marumo will describe the cloning and characterization of the vasopressin-regulated aquaporins, which control renal collecting duct water permeability. H. W. Harris will describe studies on the trafficking of water channels between subapical vesicles and the apical plasma membrane in response to vasopressin and changes in osmolality. M. A. Knepper will

then define the regulation of renal water channels and the relationship between regulation and the ability of the kidney to concentrate and dilute the urine.

Neural Control of the Circulation in Heart Failure and Coronary Ischemia

Theme area: Cardiovascular Biology. Sponsors: APS Neural Control & Autonomic Regulation, Central Nervous System, and Cardiovascular Sections. *Chair:* I. H. Zucker. *Participants:* M. R. Bristow, L. I. Sinoway, K. P. Patel, T. H. Hintze, H. D. Schultz, and M. D. Thames.

This symposium addresses an important and timely area in the nervous control of circulatory function. Although it has been appreciated that baroreflex and cardiopulmonary reflex function plays a significant role in the neurohumoral modulation of the circulation during acute coronary ischemia and in chronic heart failure, the mechanism responsible for this modulation is far from clear. Arterial baroreflex sensitivity is reduced in heart failure. Whether this reduced baroreflex function is responsible for the augmented neurohumoral drive in heart failure is not known. Vagal and sympathetic afferent function during acute ischemia is an area of important investigation, since the reflexes that these sensory endings mediate may have important effects on myocardial oxygen consumption and peripheral resistance. The talks in this symposium will help to elucidate the mechanisms involved in abnormal cardiovascular reflex function in these two pathological conditions. After an overview and introduction by I. H. Zucker, a discussion of the alterations that take place in cardiac adrenergic receptors in humans with heart failure will be presented by M. R. Bristow. L. I. Sinoway will concentrate on data from humans with heart failure and will describe microneurographic data of sympathetic nerve activity and its modulation during different states of heart failure and edema. K. P. Patel will discuss the mechanisms of abnormal sodium excretion in the rat coronary artery ligation model of heart failure and will concentrate on recent studies implicating a role for the paraventricular nucleus in the regulation of renal sympathetic nerve activity in heart failure. T. H. Hintze will talk on the role of prostaglandins in mediating abnormal cardiac (ventricular) reflex responses in pacing-induced heart failure. The last two talks will concentrate on coronary ischemia from the standpoint of local mediators of cardiac afferent and reflex function: H. D. Schultz will describe the effects of ischemia and reperfusion on the activity of ventricular vagal afferents in the rat and will further show that oxygen-derived free radicals play an important role in the stimulation of vagal afferents under these conditions, and M. D. Thames will discuss the role played by local adenosine in the stimulation of sympathetic afferents and their reflex effects during coronary ischemia in the dog. This symposium will bring together studies involving various species and models of heart failure. The techniques used are state of the art neurophysiological and cardiovascular techniques. The talks will focus on mechanisms rather than descriptive overviews of the problem. The overall question that dominates this symposium is: what are the mechanisms that result in augmented neurohumoral function in the state of heart failure and coronary ischemia? All talks will offer strong suggestions on the neural substrates involved in these pathological states.

Leukocyte-Endothelial Cell Interactions

Theme area: Cardiovascular Biology. Sponsor: North American Society of Biorheology. Chairs: D. A. Hammer and M. Lawrence. Participants: T. A. Springer, B. K. Brandley, D. A. Hammer, L. V. McIntire, M. Lawrence, and H. Lipowsky.

The trafficking of leukocytes between blood and tissues is important for the immunological function of leukocytes in the immune response such as in inflammation and lymphocyte homing. This trafficking is controlled by the rapid and selective adhesion of leukocytes to vascular endothelium. This symposium will address the biochemical and biophysical factors that control leukocyte adhesion to endothelium both in vitro and in vivo. Topics to be covered by this diverse group of investigators with biological and engineering backgrounds include molecular recognition between leukocytes (both lymphocytes and granulocytes) and endothelium, the effect of fluid flow on leukocyte adhesion both in vitro and in vivo, and the interconnection between molecular recognition and fluid force in modulating leukocyte adhesion.

Role of Nitric Oxide in Physiological and Pathological Function

Sponsor: Society for Experimental Biology and Medicine. Chair: S. M. McCann. Participants: S. M. McCann, K. Sanders, M. L. McDaniel, and V. Dawson.

Nitric oxide (NO) has been known for some time to be formed by an inducible enzyme, NO synthase (NOS), in response to activation of macrophages by bacterial lipopolysaccharide or cytokines and to play an important role in combatting infection. Recently, it was discovered that NO or a compound that releases NO is the so-called endothelium-derived relaxing factor discovered by Furchgott. NO mediates the action of acetylcholine to induce vasodilation. It is synthesized from arginine by a constitutive NOS present in vascular endothelium. Recently, constitutive NOS has been found in the central nervous system (CNS) and NO has been identified as the first gaseous neurotransmitter. There has been a virtual explosion of knowledge about NO, leading Science to designate it as the molecule of the year in December, 1992. The ramifications of these multiple roles of NO in the organism are now being elucidated, and this symposium will cover the action of NO in the cardiovascular, central nervous, and reproductive and endocrine systems and also examine its toxic actions on cells in the periphery and in the CNS, which could be involved in inflammatory and degenerative CNS diseases.

Sickle Cell Interactions With Endothelium: Implications for Vascular Pathology

Theme area: Cell Injury, Inflammation, and Repair. Sponsor: Biomedical Engineering Society. Chairs: T. M. Wick and J. R. Eckman. Participants: G. A. Lutty, D. V. Faller, V. T. Turitto, T. M. Wick, L. V. McIntire, and H. H. Lipowsky.

This session will focus on the roles of adherence, activation, and hemodynamics in initiating and propagating vascular complica-

tions in sickle cell anemia. The participants encompass a broad range of expertise from a variety of disciplines. Their discussions will identify the roles of sickle erythrocytes, coagulation factors, immune regulators, vasoactive factors, and hemodynamics in microvascular occlusion and other vascular complications common in sickle cell anemia. The techniques used by the speakers will allow for presentation and discussion of the role of red blood cell, endothelial cell, platelet, leukocyte, plasma, and hemodynamic factors that initiate and propagate vascular damage associated with sickle cell anemia.

APS Past-President's Symposium: Renal Tubular Transport of Organic Ions

Theme area: Epithelial Cell Biology. Chairs: W. H. Dantzler and J. B. Pritchard. Participants: W. H. Dantzler, G. Burckhardt, S. H. Wright, D. S. Miller, A. M. Pajor, H. Koepsell, P. S. Aronson, P. D. Holohan, and J. B. Pritchard.

Renal tubular transport of organic ions is essential for the regulation of the plasma levels of a number of endogenous compounds and the removal of numerous exogenous pharmacologically active or toxic compounds. These transport processes are even involved in the regulation of tubular transport of inorganic ions. In the past five years, there have been numerous advances in the understanding of these processes at the cellular and molecular level, but they have not been the subject of a symposium of any sort during the last ten years. W. H. Dantzler and J. B. Pritchard, who have contributed to a number of the areas to be discussed, will guide the symposium as cochairs. Dantzler will introduce the subject with a brief overview, and Pritchard will sum up the symposium with a crystallization of the important progress and significant questions for the future. G. Burckhardt will cover the steps in organic anion transport at both the basolateral and luminal membranes with an integration of the latest membrane data into the current models. D. S. Wright will do the same thing for the organic cations. D. S. Miller will then consider the intracellular steps in the transport process as the anions and cations move from one side of the cell to the other. A. M. Pajor will discuss the functional role of sodium dicarboxylate transporters that she has recently cloned and that may be essential for the transepithelial transport of organic anions in general. P. S. Aronson will discuss the way in which recycling of organic anions may influence the transport of NaCl. Finally, P. D. Holohan will discuss his recent evidence for a role for *p*-glycoprotein in the renal tubular transport of organic ions. The symposium will not only summarize the current models for transport that have evolved over the past five years but will also show the manner in which new information on the molecular structure of some transporters or the localization of p-glycoprotein in the renal tubules may alter these models.

Special Sessions

Career Opportunities in Physiology Workshop Public Affairs Symposium Women in Physiology Committee Mentoring Workshop and Reception

Lectures

APS Bowditch Award Speaker: Barbara Block, Stanford Univ. Title: Regulation of Calcium Release in Muscle: The Role of the Ryanodine Receptor in Contraction and Thermogenesis Physiology in Perspectives—The Walter B. Cannon Memorial Lecture Speaker: Kenneth Chien, Univ. of California, San Diego Title: Cardiac Muscle Diseases in Genetically Engineered Mice: The Evolution of Molecular Physiology Robert M. Berne Distinguished Lectureship of the APS Cardiovascular Section Lecturer: Harris J. Granger, Texas A&M Univ. Title: Regulation of Coronary Angiogenesis Hugh Davson Distinguished Lectureship of the APS Cell & General Physiology Section Lecturer: Michael J. Berridge, Univ. of Cambridge Title: Spatiotemporal Aspects of Calcium Signalling Joseph Erlanger Distinguished Lectureship of the APS Central Nervous System Section Lecturer: Donald J. Reis, Cornell Univ. Medical Center Title: Central Neural Mechanisms That Protect the Brain from Hypoxia and Ischemia August Krogh Distinguished Lectureship of the APS **Comparative Physiology Section** Lecturer: Jared M. Diamond, Univ. of California, Los Angeles Title: Quantitative Evolutionary Design of Physiological Systems Solomon A. Berson Distinguished Lectureship of the APS Endocrinology & Metabolism Section

Lecturer: Mladen Vranic, Univ. of Toronto

Title: to be announced

Edward F. Adolph Distinguished Lectureship of the APS Environmental & Exercise Physiology Section Lecturer: Loring B. Rowell, Univ. of Washington *Title:* How are Neural and Mechanical Effects on the Circulation Balanced During Exercise?

Horace W. Davenport Distinguished Lectureship of the APS Gastrointestinal Section *Lecturer:* Leonard R. Johnson, Univ. of Tennessee *Title:* Regulation of Gastrointestinal Mucosal Growth

Carl Ludwig Distinguished Lectureship of the APS Neural Control & Autonomic Regulation Section Lecturer: Arthur D. Loewy, Washington Univ. Title: From Smokedrums to Viral Tracing: 150 Years of CNS Autonomic Research

Carl W. Gottschalk Distinguished Lectureship of the APS Renal Physiology Section Lecturer: Steven C. Hebert, Harvard Univ. Title: The Na-Cl/Na-K-Cl Gene Family: Recent Advances in Our Understanding of the Biology of the Na-Cl-Coupled Cotransporters

Julius H. Comroe Jr. Distinguished Lectureship of the APS Respiration Section Lecturer: Jack Feldman, Univ. of California, Los Angeles Title: From Molecules to Synapses to Networks to Breathing

Claude Bernard Distinguished Lectureship of the APS Teaching of Physiology Section Lecturer: Howard Barrows, Southern Illinois Univ. Title: to be announced

APS Water & Electrolyte Homeostasis Section Distinguished Lectureship Lecturer: Pierre Corvol, College of France, Paris Title: to be announced

Experimental Biology '95

Abstract Deadline

December 1, 1994

Membership

News From Senior Physiologists

Letters to John R. Blinks

Humberto Fernández-Morán V. writes from Stockholm, Sweden: "After retiring from the University of Chicago, I went back to my Venezuelan roots by applying to the Embassies in Switzerland and in Portugal. I was then 'promoted,' and I am now the Minister-Counsellor for Scientific Affairs (Ad-Honorem) at the Embassy of Venezuela in Stockholm, Sweden. . . .I served at the University of Harvard (1958-1962) and at the University of Chicago as the A. N. Pritzker Professor of Biophysics for nearly 25 consecutive years (1962-1986). . . . I joined the APS mostly because of Orr Reynolds, a dear friend whose passing away in 1991 was deeply lamented by me and all who knew him. . . ."

From Columbia, SC, George Fulton writes that he has "retired from academic life (Shields Warren Professor of Biology and Chairman at Boston University), from research (capillary blood flow, platelet thromboembolism), and from statewide coordination of public higher educational institutions throughout South Carolina. . . .I remain active as a member of the Explorers Club (Piedmont Chapter and New York Headquarters) and as a founding member of the Columbia Chapter of the Shepherd's Center. . . ."

Writing from Newcastle upon Tyne, United Kingdom, John E. Cotes says he felt honored to have received birthday greetings on the occasion of his 70th birthday, "particularly since I have been an infrequent attender at APS meetings. However, my first, which were the Federation and Fall meetings in 1957, made a great impression and gave me an enduring affection for the Society. I was then a research fellow in **Dick Riley**'s lab in Baltimore, and the experience helped to establish me as a research scientist, first at the British Medical Research Council's Pneumoconiosis Unit near Cardiff and subsequently the Respiration and Exercise Laboratory attached to the University Departments of Occupational Health and Physiological Sciences in Newcastle upon Tyne."

Cotes adds that his "early career benefitted from what I regard as sound advice given me by Arthur Ellis, then Regius Professor of Medicine at Oxford, that one should do something different than everybody else!"



Leonard S. Dreifus writes from Philadelphia, PA, that he is "still active in research and teaching" and is presently the Division Director of Cardiology at Hahnemann University. "I hope to carry on for a number of years as well. In addition to my teaching and research assignments, I am still active in consulting on cardiovascular diseases on the clinical level."

From Seattle, WA, **B. Raymond Fink** writes "Yes indeed. Eighty ahoy! But the sap is still flowing. I've been determining the volume of the spinal cerebrospinal fluid in volunteers by magnetic resonance imaging, obviously with expert partnership from radiologists — Ken Marivalla and Todd Richards. It's part of an attempt to make spinal anesthesia dosage less flyby-seat-of-pants. . . .I have the unending stimulus of my lovely life-partner Peggy, two truly happy daughters and five bright grandchildren who enjoy work as much as play, enough to leave me time to design and/or supervise the historical publications by the Wood-Library Museum of Anesthesiology."

"I am pleased to inform you that I am still the director of the Fidia Georgetown Institute for the Neurosciences," writes **Erminio Costa** from Washington, DC. "I am not planning on terminating this activity in the immediate future."

"Mildred and I are keeping active by maintaining three homes," writes John C. Finerty from Houston. "June to September in northern Wisconsin; October to December in Green Valley, Arizona; and the winter and early spring in Houston. I'm still playing golf 3 to 4 times a week, but haven't shot my age on a regulation par 72 course yet. I'll keep trying."

Virginia H. Donaldson writes from the Children's Hospital Medical Center in Cincinnati, OH, that she "is still an active member of a faculty with appointments in both pediatrics and medicine and with collaborative efforts in the Department of Physiology here at the University of Cincinnati. I am continuing with scientific and other writing and scientific activities. Barring financial mishaps, I hope to continue this for the next few years."

Letters to Suk Ki Hong

From Norman, OK, Carlton E. Melton writes that he spent the first eight years of his career doing eye research, first at Western Reserve University Medical School and then at The University of Texas Southwestern Medical School. He joined the FAA Civil Aeromedical Institute in Oklahoma City in 1961, where he retired in 1984 after 23 years there. "I resumed my teaching in 1985 at the Oklahoma City University, teaching human anatomy, physiology, and cell biology to undergraduate students. Teaching undergraduates has been immensely rewarding. It has allowed me to keep abreast of developments in biology and to be stimulated by helping youngsters in the early stages of their careers. I heartily recommend teaching at this level for seniors who want to stay active in biology but who have no funds for research. Since my retirement, I have also had my own human factors consulting business, working mainly with the federal government and private industry."

Melton would like to leave these words of too prudent and cautious in your research: "follow your hunches and intuition. Sometimes you know more than you think you do. Besides, plodders have less fun than plungers!"

Edward J. Masoro writes from the University of Texas Health Science Center that he retired in 1991 as Chair of the Department of Physiology and has since served as the Director of the Aging Research and Education Center. "I am still writing research papers as well as review articles. I am the editor of the Journal of Gerontology: Biological Sciences and of the volume on Aging of the Handbook of Physiology Series which should be published in 1995. I am also the President-Elect of the Gerontological Society of America."

"I have no words of wisdom. I was lucky to have become a faculty member when research was fun and funding assured if good work was done. To my mind, the fierce competition for research funds faced by the current faculty members takes the fun out of research. I probably would not choose a career in academic physiology in today's environment."

From Duke University in Durham, NC, Robert Plonsey, writes that, even though he is 70, his University activity has not changed except for taking the summers off to travel. "I give a lot of thought on how I want to spend my remaining years. My field of electrophysiological modeling has been growing rapidly in the last few years, and without putting forth a very high level of effort, it will be hard to remain productive. Fortunately, my health has been excellent, enabling me to keep as active as I have, and I do enjoy reading about others experiences, especially those published in The Physiologist."

W. Glen Moss, writing from the Shenandoah area, thanks the Society for remembering that he is "approaching the 'tender age' of post adulthood (80). I still refuse to accept aging. This fall, I interred my wife's ashes in Wichita, KS, where we both grew up. Upon returning, I was invited by BioReview Inc. to set up two review committees for the USAMRTDC-Breast Cancer Program. When I finish the summary statements for these, I'm sure I'll never want to work again though handling review was the kind of work I liked most at the NIH."

Letters to Helen M. Tepperman

John Brobeck begins his letter with a brief history of the drawing of Beaumont House on the FASEB campus that is pictured on the birthday cards. He writes from the University of Pennsylvania, where he continues to work with the Provost's office reviewing personnel folders from medicine, veterinary medicine, dental medicine and nursing. "I appreciate the privilege of keeping informed about what goes on in our several faculties and also the continuing scientific education of reading about their research achievements. I am employed annually, however, and know that sooner or later a Provost will ask, 'Just why do we need a Brobeck?'''

Ernest B. Brown, Jr. writes, "I will join the ranks of octogenarians on July 13. We live across the road from a golf course, and I manage to play nine holes once or twice a week. It is probably an exaggeration to call what I do these days, 'golf'. I enjoy reading the APS publications and on occasion I think I should write a letter to remind the younger generation that we actually did a pretty good job of both teaching and research before computers were invented!"

Karl H. Beyer, Jr., writes from Penllyn, PA, and reflects that "The Society and I have seen tremendous advances in our field since my professor, Walter J. Meek, introduced me to his friends at my first FASEB meeting of APS in Memphis in 1936. He proposed me for membership in The Society in 1938 or '39.

"While I was still a graduate student and medical student at Wisconsin. it became very clear to me that to do the things I wanted to do in research, I needed to be able to work with other scientists in a way that they, too, enjoyed and contributed to what we were doing. A record of 30 years with, first, Sharp and Dohme laboratories, then the combined Merck Sharp & Dohme Research Laboratories of Merck & Co. is one of accomplishment of which I am proud to have been a part. Even so, I retired at 59 'to do what I wanted to do when I wanted to do it.' Opportunity gave definition to that uncertain objective."

Since retiring Beyer has been very active as Visiting Professor at the Vanderbilt and Hershey Schools of Medicine and later with Valles Center for Biochemical and Biophysical Sciences and Medicine at Harvard. He spent many years as Chairman of the Cosmetic Ingredient Review Committee of the Cosmetic Association, reporting that "The dermatologists, biochemists and pathologists of CIR were, and are, a stimulating group and so were the problems we handled. Our reports were published in the Journal of American College of Toxicology." More recently, Beyer helped to organize and chaired for a time the Philadelphia Association for Clinical Trials, which has "the purpose of attracting drug research to laboratories and clinics within the schools that were competent to conduct NDAquality research.

"I have been busy doing what I want to do, which is mostly trying to be helpful. But to continue to be effective in the time remaining, I know now that I shall need to take more time 'to smell the roses,' to respect the need for rest and diversions Camille and I enjoy, such as gardening, golf, music, and new knowledge."

Letters to H. Kellogg

William Ullrick writes from the Boston University Medical Center, where he maintains an office to continue his research on the history of muscle physiology, mainly nineteenth century. He relates that "there are thousands of publication on muscle during this period. The vast majority written in either French or difficult German. I have finally gotten on top of these and have organized the material into a twovolume set complete with numerous illustrations."

As for his words of wisdom to our younger generation, "I can only repeat what many others have said: If you are confused about where you are now, then you really should find out where you came from; or, don't short change the historical background of your research field!" From San Diego, CA, Claire Zomzely-Neurath writes "My husband died two years ago and I'm finally beginning to accept the fact that he is gone forever. I had a wonderful marriage for 29 years, so I was very fortunate.... I'm very busy with music. I play viola in two orchestras and also have a quartet group. We perform at nursing homes during the year. I also do some freelance technical writing."

Bernard Wortman writes from Bethesda, MD: "I have engaged in 30 years of biomedical research at major medical centers and Federal laboratories. The latter part of my career followed a natural direction into research planning and administration at various levels of responsibility. Upon retirement from Federal employment, I developed my own consulting firm. This activity kept me involved in the management of peer evaluation of biomedical research. After a period devoted to family and personal activities, I am developing consulting activities related to a pediatric health newsletter. This newsletter will be useful and will be available to young families before too long."

From Manilius, NY, Jay Tepperman submits his reflections on turning 80, "Since I retired 'early' at 71 these years have been among the best of my life. Two decades ago '80' conjured up visions of Nathan Shock's dismal downhill graphs of accumulating physiologic deficits with advancing age, but, for this fortunate rookie octogenarian, the realty has been far happier. My health has been good, and I still have my original issue teeth. I keep abreast of recent scientific and clinical advances. I do science entirely vicariously via several family members. Helen, in addition to volunteer work, still has the energy to prepare elegant seminars for our Endocrine Journal Club.

"During my long stretches of private time, I seem to have regressed to the teenaged English Lit major I was at Penn 61 years ago. I read all sorts of things, some separated by a millennium or two. Recently, I have become addicted to the videotaped lecture courses produced by The Teaching Company. The lectures are given by superstar teachers, they have enormously enhanced my appreciation of books I thought I had understood. It is a great luxury to sit in one's warm suburban cocoon listening to a brilliant lecture on Dante, Rousseau or Cervantes in a nasty Upstate New York blizzard."

Letter to Robert Grover

Lloyd D. MacLean, at McGill University, Montreal, Canada, writes, "I am pleased to report that I am alive and well even though I am now over 70. I am currently president of the American College of Surgeons, which keeps me active and in touch with younger people. I have discontinued operating but do see patients in a longterm follow-up clinic. It was quite easy to give up operating on patients; however, it would be quite another thing to be required to discontinue scientific interests and the reading and writing so closely allied."

He continues, "I have had an interest in the surgical treatment of individuals with severe obesity and continue studies on these patients concerning the incidence of return to normal weight, long-term follow-up, caloric intake, energy expenditure, body composition, and studies on quality of life."

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Gilroy Fire Destroys Lab Animals

Fire broke out at in a building at Simonsen Laboratories in Gilroy, CA, on July 9, 1994, killing about 170,000 rats, mice, and guinea pigs. A 30,000 square-foot building housing animals bred for research was destroyed. Although Simonsen had previously been a target for animal activists, in the aftermath of the fire there was no evidence that the blaze was intentionally set.

Nature Letter Reports Animal Care Incident

The following letter appeared in the July 14, 1994, issue of *Nature:*

Not So Humane

Sir—We would like to bring to your attention a patent violation of animal rights, paradoxically caused by extreme human[e] care.

The episode took place last January in an Italian medical institute, where a precious primate was kept in temporary custody. The specimen was an adult female in the latest stage of pregnancy. Because of the considerable value of both mother and fetus, labour was monitored throughout by the use of a cardiotocograph. For this purpose, the mother was restrained in an uncomfortable supine position. For greater safety, uterine dilation was monitored by manual inspection, about 6 times an hour, each time causing evident pain to the animal. Finally, just before delivery, episiotomy was performed to reduce the risks of delivery.

Both mother and baby are now perfectly well, but we believe that this and similar cases should be brought to the attention of whoever cares for animal welfare.

We certify that what is reported is true: one of us is the primate in question.

Lucia Galil-Resta, Istituto di Neurofisiologica Giovanni Resta, Istituto di Elaborazione dell'Informazione Consiglio Nazionale delle Richerche, Pisa, Italy

Animal Dealer Loses License

The USDA took away the Class B dealer's license of Jerry Vance, a Slate Springs, MS dealer, who was accused of violating the Animal Welfare Act. Vance was the subject of nationwide publicity last year when he was featured as part of an investigative story on pet theft on the CBS News program "Eye to Eye with Connie Chung." In addition to surrendering his license, Vance has been fined \$5,000 for his failure to comply with the Animal Welfare Act.

Court Overturns Second Richey Decision

The US Court of Appeals for the District of Columbia Circuit has overturned a ruling that would have invalidated USDA Animal Welfare Act (AWA) regulations concerning dog exercise, the psychological well-being of primates, and caging requirements for various species.

This important decision was handed down on July 22, 1994, only two months after another Appeals Court panel invalidated a ruling that would have required the USDA to issue AWA regulations on the care of rats, mice, and birds. The decisive issue for the three-judge panel was that the plaintiffs in the case, led by the Animal Legal Defense Fund (ALDF), could not meet the legal tests of standing in order to sue.

The APS joined in an *amicus curiae* brief supporting the government's case in the appeal and also contributed to the legal costs incurred by the National Association for Biomedical Research (NABR). NABR successfully petitioned the court for the right to join the case as a codefendant in order to represent the interests of the research community in its outcome. The research community was concerned that the earlier ruling would have resulted in regulations that were costly (almost \$2 billion according to USDA's reckoning) without necessarily improving animal welfare.

The ALDF and its coplaintiffs had argued that the USDA failed to meet statutory requirements to establish minimum requirements for animal care when it issued its final AWA regulations. Although draft AWA regulations released in 1989 used precise engineering standards, USDA received forceful public comments from the research community arguing that there was no scientific basis for those standards. The regulations were reformulated as performance-based standards allowing individual research institutions to determine how they would meet research animals' needs in various areas. The ALDF et al. insisted that engineering standards should have been used in the final regulations, and in February 1993, US District Court Judge Charles Richey issued a ruling siding with the plaintiffs.

But the government and NABR appealed, and in July 1994 the Appeals Court ordered that the suit be dismissed because the plaintiffs lacked legal standing to sue on behalf of research animals. This ruling echoed the May 20, 1994, decision on the appeal of another ALDF suit concerning the AWA in which the same judge had ruled that rats, mice, and birds should be covered under AWA regulations. Both cases were decided not on the merits of the arguments but on the grounds that the plaintiffs could not cross the legal hurdles to prove that they had a direct interest at stake and therefore should be granted standing to sue on the animals' behalf.

These decisions are good news because, for the moment, the court has taken the position that animal activists may not arbitrarily intervene as self-appointed advocates for research animals. However, these victories do not mean that the issue is settled.

After the May 20, 1994, decision, much of the press coverage focused on the fact that the case was essentially thrown out on a technicality. On July 8, 1994, a news brief was published in the Health section of The Washington Post with the headline "Rats, Mice, Birds: They're Not Animals?" The article states that because these species were not included in the definition of animals covered by the AWA, their treatment "fell through a gaping regulatory crack." The article includes a quote from coplaintiff Martin Stevens of the Humane Society of the United States (HSUS), who ridiculed the standing issue and at the same time paved the way for a campaign for a legislative solution to that obstacle. Stevens said it will be difficult for the HSUS to appeal the decision "unless we can teach these animals to represent themselves." Stevens' remarks could well be the start of a campaign to turn judicial defeat into legislative victory.

The July 22, 1994, decision reveals another disconcerting development: Appeals Court Chief Judge Abner Mikva wrote a concurring opinion suggesting that if the plaintiffs had taken a slightly different approach they might have met the court's requirements to be granted standing to sue on the animals' behalf. Mikva said the plaintiffs they should have claimed that they had "an interest in protecting the well-being of specific laboratory animals (an interest predating this litigation)." Had they done so, Mikva stated, "I think appellees would have had standing to challenge those regulations for providing insufficient protection to the animals."

The ALDF and its coplaintiffs have the option to ask that the case be reconsidered by the full Court of Appeals and beyond that even to the Supreme Court. However, they might instead bring a new suit with arguments crafted using the advice offered by Judge Mikva. They might also try to solve the problem another way, by having their supporters in Congress reintroduce legislation that would simply grant them legal standing to sue on behalf of research animals.

Health Reform Debate Includes Medical Trust Fund

As Congress began its consideration of health care reform, a scaled-down version of the medical research trust fund proposed by Senators Tom Harkin (D-IA) and Mark Hatfield (R-OR) had been incorporated into the major plans under consideration.

The Senate Democratic leadership bill unveiled by Senate Majority Leader George Mitchell (D-ME) on August 2, 1994, would set aside 0.25% of all private health insurance premiums for a medical research trust fund. Approximately 80% of the resulting trust fund would be made available to the NIH, and the remaining 20% of the trust fund would go to the Agency for Health Care Policy and Research. The bill also stated that trust fund monies were not to "reduce or replace" regular NIH appropriations.

The research community has been advocating a 1% setaside, but even the 0.25% advocated by Mitchell was expected to face a stiff challenge from fiscal conservatives.

Based upon a summary released in advance of the actual text, it seemed likely that the health care reform bill developed by House Majority Leader Richard Gephardt (D-MT) would also contain some version of the medical trust fund proposal.

During the late spring while health care reform was being widely discussed, the APS joined with some 150 organizations to endorse a consensus statement on the importance of medical research to the health of the American people. The document, *Medical Resarch: Progress and Promise for the Patient*, was hand-delivered to every member of Congress on May 2, 1994. The statement, developed under the auspices of Research!America, was also sent to the White House and to policy leaders at the nation's health and research-related agencies.

"Too many Americans are suffering and dying needlessly because, as a nation, we don't invest enough in medical research," the statement says. "Just one discovery can save millions of lives and billions of dollars." The statement notes that, in 1993, the US spent less on medical research in the entire year than it did in 10 days for health care. At the same time, a nationwide Harris Poll found that 91% of Americans believe the US should spend more on medical research to better diagnose, prevent, and treat disease.

The Research!America consensus statement outlined a number of policy recommendations, including making medical research an integral element of health care reform and increasing the capacity of federal agencies such as the NIH, National Science Foundation, and Veterans Affairs to support medical research. It called for efforts to make sure that academic health centers receive stable federal funding support for medical research and the education of medical scientists. The statement called upon those crafting health care reform to ensure that the health delivery system makes the fruits of medical research available and accessible to all patients in need. Other recommendations included making efforts to increase the recruitment, training, and retention of medical scientists a part of health care reform. The statement also called for special efforts to recruit women and underrepresented minorities into medical research careers.

Senate Passes NIH Funding Bill

The Senate on August 10, 1994, approved a \$11.333 billion FY 1995 appropriation for the NIH, a 3.6% increase over FY 1994. The Senate bill came in some \$11 million above the funding approved by the House, which provided a 3.5% increase.

The Senate bill did not include the President's proposed one-year "pause" in indirect cost payment increases. In the legislative report that accompanied the bill, the Senate Appropriations Committee stated that the pause proposal "fails to provide an effective or equitable resolution of this issue." The House Appropriations Committee also left the pause out of its bill, but its report called on the Administration to offer other suggestions for revising the indirect cost system. The Senate Committee, by contrast, noted that the Office of Management and Budget and the Office of Science and Technology Policy had begun a "comprehensive review" of indirect costs and said that it "expects that this process be considered carefully, and geared to arrive at a timely and long-term solution to the indirect cost issue."

The Senate Committee report noted that, because of budget constraints, NIH-supported health research will increase less than the rate of biomedical inflation next year. It expressed concern that "medical research is not at its optimal level of priority and support relative to its importance to national security" in a post-cold war world. To address that problem, the Committee earmarked \$1 million for the Office of the Director to commission a National Academies of Science and Engineering and Institute of Medicine study on "critera that should be used in judging the appropriate allocation of funds to research and development activities" among various federal research and development agencies.

International Physiology Committee Workshop at Experimental Biology '94

The workshop on "Prerogatives and Commitments Pertaining to Foreign Nationals: The US, Institutions, and Sponsors," organized by the International Physiology Committee (IPC) was held on April 24, 1994, during Experimental Biology '94. The panel consisted of Rodolfo A. Palazzolo (Vice-Chancellor for Academic Administration, University of Tennessee, Memphis) and Carlos Najib (a foreign student at California State University Long Beach). The invited representative of the US Immigration and Naturalization Service (INS), Los Angeles District, failed to appear; no prior notice was received. In its way, this behavior expressed unfortunately all too well one of the chief complaints voiced about the INS. The moderator was Clark M. Blatteis (University of Tennessee, Memphis), who represented the IPC.

Palazzolo is the foreign-scholar specialist on his campus with 17 years of practical experience in this subject matter. He filled in very ably for the missing INS official, reviewing for the audience the current law on immigration relevant to foreign trainees in the US (the McCarran-Walker Act of 1952, as amended by the Immigration Act of 1990, which was implemented on January 1, 1992). He then presented several case histories selected to exemplify the context of the questions raised earlier in the announcement of this workshop in The Physiologist (37: 28-29, 1994) and provided the answers. Najib subsequently brought up several concerns pertinent particularly to the status of students. Finally, this formal part was followed by a very active exchange between the panel and the audience. Many participants expressed their frustration at the complexity of the immigration and naturalization rules and regulations and to the problem of accessibility to the INS officers to obtain simple and direct answers. A number of additional, specific questions were also raised by the audience. The most topical among these have been added, with their answers, following the 20 questions previously published in *The Physiologist* with their answers.

Judging from the overall response, it would seem that this workshop was timely and important. It met a need, particularly because the requisite expertise to answer the immigration questions or help solve the immigration problems of foreign nationals training in our institutions, or for that matter of their sponsors, does not appear to exist on all campuses. This is expecially the case of schools located away from their university's main campus.

Questions for Sponsors with Answers

- 1. Must you provide foreign nationals wishing to work with you with information regarding your institution's exchange program/travel/housing and cost?
 - Answer: Yes. The sponsoring institution must provide a system to screen and select prospective foreign nationals to ensure that they are eligible for program participation and that the program is suitable to the visitor's background, needs, and experience and the exchange visitor possesses sufficient proficiency in the English language to participate in the program. In addition, sponsors must provide exchange visitors with prearrival materials including but not limited to information on 1) the purpose of the exchange visitor program, 2) home-country physical presence requirement, 3) travel and entry into the US, 4) housing costs that the exchange visitor will likely incur (e.g., living expenses), 5) health care and insurance, and 6) other information that will assist the exchange visitor to prepare for his/her stay in the US. Sponsors must also offer appropriate orientation for all exchange visitors. Sponsors are encouraged to provide orientation also for the exchange visitor's imediate family. Orientation

must include but not be limited to information concerning 1) life and customs in the US, 2) local community resources (e.g., public transportation, medical centers, schools, libraries, and banks) to the extent possible, and 3) available health care, emergency assistance, and insurance coverage.

- 2. Must you provide a detailed description of research projects in progress and the role the foreign national is expected to play in them?
 - Answer: Yes. Sponsors must provide adequate description of the research project in which the foreign national will be involved and the extent of the involvement.
- 3. Are you really expected to be conscious of the cultural differences and the work ethics of the foreign national?
 - Answer: As we all know, culture and work ethics differ from one part of the world to another. It is the sponsor's responsibility to make sure that the foreign national is aware of the work ethics of the US and that he/she needs to conform to them.

- 4. Is it required under law that you discuss progress or shortcomings often with the foreign nationals in your lab so that they may correct deficiencies or feel good about themselves?
 - Answer: It is not required under law to do so; however, it is always wise to discuss and document progress and shortcomings of the work of your junior researchers. This documentation could be used to promote and supplement their salaries or dismiss them, as the case may be.
- 5. Do you know the maximum durations of the J-1 and H-1 visas? Do you know the differences between them and whether one can be changed into the other or into a Permanent Resident visa?
 - Answer: The duration of the J-1 visa is three years with a maximum extension of one year, if needed evidence is submitted. This visa may be changed to another nonimmigrant or immigrant visa only if the foreign national is not subject to the two-year home country residency. The duration of the H-1 visa is for a maximum of six years in one-, two-, or three-year intervals. This visa may be changed to any nonimmigrant or immigrant visa.
- 6. Do you encourage your Fellows to stay and work in the US? Could they legally get a regular academic or industrial job here?
 - Answer: Fellows should be encouraged to go back home; however, in some instances it is wise to assist them in remaining in the US if a permanent job may be obtained.
- 7. Are you aware of the factors to consider in sponsoring a foreign national for a H-1 visa or for a US Permanent Kesident visa?
 - Answer: Factors to be considered in sponsoring foreign nationals for a H-1B visa have become much stricter. A Labor Condition Application and a commitment to pay their ticket back home, should they be dismissed for any reason, are required.
- 8. Do you know the responsibilities of the institution and your own to a foreign national's dependents?
 - Answer: Legally, the responsibility of a dependent is that of the spouse or parent. However, we need to do everything possible to facilitate the acculturation of the dependents so that they would feel at home and at ease in order to become a support to the foreign national rather than a burden.
- 9. What is a "Skills List"?
 - Answer: A Skills List is a list prepared by the US Department of Labor identifying the skills that are in short supply in different countries around the world.

- 10. Do you have a legal responsibility to a foreign national in your lab who does not wish to return to his/her own country?
 - Answer: No. However, we have the moral responsibility to assist the foreign nationals in any possible way that we feel is most beneficial for them and their families.
- 11. Are you aware that the new INS requirements for insurance for J-1 visa holders affect you directly?
 - Answer: The new INS requirements for a J-1 visa are too numerous to mention. It suffices to say here that you need to check with your International Office before you decide to sponsor a foreign national.
- 12. Do you know what to do if you do not get your expected grant renewal and your funds will run out this year but you invited your Fellow for two years?
 - Answer: Sponsors need to be sure of availability of funds for the whole period of sponsorship. Should funds run out, give sufficient notice to the foreign national and assist him/her to find another position. Your commitment to two years may be construed as a contract and you may have a court battle. It is best to request a visa for one year at a time.
- 13. Do you know your responsibilities and prerogatives under the law if your Fellow's performance is unsatisfactory and it would be best if he/she left?
 - Answer: It is your responsibility to monitor and document the shortcomings of the work of the foreign nationals. Give them sufficient time to get settled and improve if they are not doing well. If this is not possible, give them notice and dismiss them. Notify the International Student Office immediately.
- 14. Are you aware of associations here that can help Chinese, Kenyans, Russians, etc., with their specific problems? To whom should you or they normally turn?
 - Answer: This depends on the kind of problem. In most instances, the institution's Office of International Affairs will be able to either solve the problem or refer the individual to the appropriate campus office, community organization, or governmental agency. It is always wise to utilize the student organizations of the same country of the individual if it exists on campus.
- 15. How can a deportation order be appealed? How much extra time will that allow the foreign fellow in the US? Can he/she work during that time?
 - Answer: A Motion of Appeal needs to be filed through the INS.
- 16. Do you know what to recommend if your Fellow falls in love and wishes to get married to a US citizen? Will

he/she have to leave the US anyway when his/her visa expires?

- Answer: It depends. If there are no visa restrictions, then a change of status may be requested directly through the INS. If there is a visa restriction, such as the two-year home country residency for the J-1 visa holders, then a waiver could be requested. If this not possible or is denied, then a two-year physical absence from the US is the only solution.
- 17. Do you know why some J-1 visa holders have a two-year home country residency and others do not? How can one obtain a waiver of the two-year home country residency?
 - Answer: If the foreign nationals who come to the US are sponsored by their government or by the US government (or one of its agencies), or if their profession is on the Skills List of his/her country, the chances are that they will have a two-year home country residency requirement. A request for waiver is initiated by the foreign national directly to his/her government (through their embassy in Washington, DC).
- 18. Do you know who pays income taxes and who doesn't and how to get a waiver from paying these taxes?
 - Answer: Many countries have individual treaties with the US relating to the payment of income tax. Check with the IRS and your payroll office.
- 19. What do you advise when your Fellow, who is on a J-1 (or H-1) visa, would like to attend a professional meeting abroad, as to what he/she must do to be able to reenter the US without difficulty?
 - Answer: Again, it depends on the visa that the foreign national is holding. A valid J-1 (pink copy) will need to be signed by the responsible or alternate officer at the institution testifying that he/she is in good standing and is expected to return. H-1 visa holders may enter and exit as many times as they wish for the validity of the visa with a letter from the institution verifying that they are in good standing. If an H-1 visa was obtained as a result of a change from another visa after entering the US and the foreign national then leaves the country, he/she will need to go to the closest US Consulate, Visa Section, and request that the visa in his/her passport be changed to that of an H-1B visa.
- 20. How do you handle this complaint: "My stipend is lower than that of my US counterparts. I agreed to the terms before coming, but I did not know the salary range. This is unfair."? Do you have a liability, under law?
 - Answer: J-1 visa holders face this problem frequently. No one should pay a foreign national less than they would pay a US citizen with the same qualifications. The US Government is imposing the payment of the prevailing wage or the actual wage (whichever is higher) in more and more cases. You may be liable if

you are taken to court or reviewed by the Department of Labor.

- 21. Who needs to obtain a waiver, and what is the process?
- Answer: Foreign nationals who have a two-year home country residency may not change their J-1 visa status to any other visa unless they do one of two things: 1) spend two years in their home country or 2) obtain a waiver. A waiver is initiated by the foreign national contacting his/her embassy in Washington, DC, requesting a no-objection statement from his/her own government. The government approves the request and forwards approval to the US Information Agency. The US Information Agency reviews and recommends approval to the INS, which then approves or denies. This process may take four to six months.
- 22. Are J-1 dependents (J-2) subject to the two-year residency?
 - Answer: Yes. Dependents of J-1, who are called J-2, are subject to all the conditions imposed on J-1. Waiver granted to J-1 is usually also granted to dependents.
- 23. Do foreign nationals pay taxes?
 - Answer: The answer to this question varies depending on the country of the foreign national. Some countries have treaties with the US relating to the payment or nonpayment of taxes. Always check with the IRS for details.
- 24. What are aliens of extraordinary ability, and can they be brought for short terms?
 - Answer: A petitioner can prove that an alien has demonstrated extraordinary ability through sustained national or international acclaim either by submitting evidence that the alien has received major, internationally recognized awards or by submitting documentation of at least three of the following: 1) a nationally or internationally recognized award or prize for excellence in this field; 2) membership in associations in the field for which the classification is sought; 3) participation on a panel or individually as a judge of the work of others; 4) published material in professional or major trade publications; 5) evidence of the alien's authorship of scholarly articles in the field in professional journals or the major media; 6) evidence of the alien's original scientific, scholarly, or business-related contributions of major significance in the field; 7) evidence that the alien has been employed in a critical or essential capacity for organizations and establishments that have distinguished reputations; and 8) evidence that the alien has commanded a high salary. Such aliens may indeed be brought for shortterm visits for consultations.

People and Places

Suzanne S. Palmer has relocated to the Department of Physiology at St. George's University School of Medicine, Grenada, Spain. She was formerly at Texas Tech University Health Sciences Center.

Formerly at Louisiana State University, **Dan Torbati** has relocated to the Division of Critical Care Medicine, at Miami Children's Hospital, FL.

Accepting a position with the Exxon Company, Houston, TX, as Associate Medical Director, Lawrence W. Raymond has moved from East Carolina University School of Medicine in Greenville, NC.

Robert F. Rakowski has been named the new Chairman of the Department of Physiology and Biophysics of the Finch University of Health Sciences at the Chicago Medical School, Chicago, IL.

James Pivarnik has moved from Texas Children's Hospital in Houston to the Department of Physical Education and Exercise Science at Michigan State University.

Robert W. Phillips has returned to the Department of Physiology, Colorado State University from NASA Headquarters, Washington, DC.

Originally from the Gunma University School of Medicine, Japan, Shuichi Okada is now with the Department of Physiology and Biophysics, University of Iowa College of Medicine, Iowa City.

Donald A. McAfee, formerly with Whitby Research Inc., Richmond, VA, has become President and CEO of Discovery Therapeutics Inc., also in Richmond.

Jeffrey R. Demarest has moved to Juniata College, Huntingdon, PA, from the Department of Biological Sciences, University of Arkansas.

The Chairman of the Department of Medicine of the Maricopa Medical Center in Phoenix, AZ, is now **Richard W. Carlson**, who was formerly with the Department of Medicine at the University of Illinois College of Medicine. Having previously served in the Department of Surgery, Johns Hopkins University School of Medicine, **Timothy G. Buchman** is now the Director of Burn, Trauma and Critical Care, Department of Surgery of the Washington University School of Medicine in St. Louis, MO.

J. Antonio G. Lopez relocated to the University of Iowa Hospitals and Clinics in the Cardiovascular Division of the Department of Internal Medicine. Previously, he was with Temecula Valley Cardiology in Murrieta, CA.

Peggy L. Barrington is currently in the Department of Biomedical Sciences, University of Illinois in the College of Medicine. Her previous position was with the Department of Pharmacology, Northwestern University Medical School, Chicago, IL.

Having left the Department of Internal Medicine, University of California, Davis, **John David Symons** presently holds a position with the Alliance Pharmaceutical Corporation, San Diego, CA.

Previously from the Department of Anesthesiology, University of Rochester, NY, **Donald J. Meyer** has moved to the Department of Anesthesiology, University of Missouri, Columbus, MO.

Kirk L. Hamilton has moved from the Biology Department, Xavier University, New Orleans, LA, to the Department of Physiology, the University of Otago School of Medicine, Dunedin, New Zealand.

Lisa C. Freeman has moved from the Department of Physiology, University of Rochester, NY to the Department of Anatomy and Physiology, College of Veterinary Medicine, Kansas State University, Manhattan.

Accepting a position with the Department of OB/GYN and Reproductive Science of the Magee-Women's Research Institute in Pittsburgh, PA, is **Kirk P. Conrad**, formerly with the Department of Physiology, University of New Mexico School of Medicine, Albuquerque.

David E. Millhorn has moved from the Department of Physiology, University of North Carolina, Chapel Hill, to the Department of Molecular and Cell Physiology, University of Cincinnati College of Medicine, Cincinnati, OH.

Benjamin O. Anderson has accepted a position in the Department of Surgery, University of Washington, Seattle. Formerly, he was with the Department of Surgery, Sloan-Kettering Cancer Center, NY.

Andre L. Vallerand has accepted a position as Human Performance Staff Officer at the Directorate of Research & Development-Human Performance, National Defence Headquarters, Ottawa, Canada. He was formerly with the Defence and Civil Institute of Environmental Medicine, Toronto, Canada.

Formerly of The Lovelace Institutes, Albuquerque, NM, Stephen C. Wood has accepted a new position as Chairman, Department of Physiology, East Carolina University School of Medicine, in Greenville, NC.

Timothy Gordon West, formerly with the Department of Zoology, University of British Columbia, Vancouver, Canada, has accepted a new position with the Department of Zoology, University of Cambridge, UK.

Bill J. Yates has joined the Department of Otolaryngology, University of Pittsburgh, PA. Previous to this new position, he was with the Laboratory of Neurophysiology, The Rockefeller University, NY.

Janice W. Maran has accepted a position with the Medical and Technical Research Association of Wellesley, MA. Previously, she was with Diacrin, Inc., of Charlestown, MA.

Moving from the National Institute on Aging in Bethesda, MD, **Kishena C. Wadhwani** has accepted a position with the Food and Drug Administration in Rockville, MD. **Bruce Halpryn** has accepted the position as Section Head, Department of Cardiac Drug Development, Procter and Gamble Pharmaceuticals, Cincinnati, OH. Prior to his new assignment, he was with Norwich Eaton Pharmaceuticals.

Department of Exercise & Health Science of Alma College, in Alma, MI, is the new address for **Donald W. Rodd**, formerly with the Department of Biochemistry, University of Kentucky, Lexington.

Originally from the University of Calgary Sport Medicine Centre of Alberta, Canada, Gordon O. Matheson is now the Director of Sport Medicine, Stanford University School of Medicine, Stanford, CA.

Boston Biomedical Research Institute Names New Director

The Boston Biomedical Research Institute announced the appointment of Kathleen G. Morgan as its new Director, effective January 1, 1995. Morgan was also appointed to the position of Amelia Peabody Senior Scientist. Morgan is currently Associate Professor of Physiology in the Department of Medicine at the Harvard Medical School's Cardiovascular Division at Beth Israel Hospital in Boston, MA, where she has worked for twelve years, during five of which she also held an Established Investigatorship of the American Heart Association. Morgan received her PhD in Pharmacology from the University of Cincinnati and her BS degree in Chemistry from the College of Mount St. Joseph in Cincinnati, OH.

John West Named to Russian Academy of Sciences

John B. West, professor of medicine and physiology at the University of California San Diego School of Medicine, has been elected as a lifetime Foreign Member of the prestigious Russian Academy of Sciences. The Academy was founded in 1725 and is based in Moscow. It is the chief coordinating body for scientific research in Russia, and it overseas a network of about 300 research establishments. The Academy has approximately 140 Foreign Members, including 30 from the US. Most of the US members are in the physical sciences, and only four represent the biomedical sciences. West has been actively involved in the Russian space medicine and physiology program for about 15 years. He is currently planning medical studies for 1995 with American astronauts and Russian cosmonauts aboard the Russian space station MIR.

APS Member Receives Excellence Award

Joseph V. Levy was recently awarded the Lucien Szmyd Memorial Award for Excellence in Teaching, which was presented by The University of Pacific School of Dentistry in San Francisco, CA. This is the highest teaching award recognition given to a faculty member by the students. Levy is Professor and Chairman of the Department of Physiology, where he has served as a faculty member since 1968.



Kathleen G. Morgan, Director-Elect of Boston Biomedical Research Institute, with John Gergely, Co-Founder and current Director of the Institute.

Research Associates in Space Biology. The current Space Shuttle Program has allowed the development of space biology science, which offers exceptional opportunities for research. The National Aeronautics and Space Administratrion 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 if the renewal proposal is approved. Funding will begin July 1 to October 1, 1995. US citizens and permanent resident aliens with PhD, MD, DVM, DMD, or equivalent degrees are eligible to apply. Proposals are due February 15, 1995. Information and application booklet: Gerald Sonnenfeld, Department of General Surgery Research, Carolinas Medical Center, PO Box 32861, Charlotte, NC 28232. Tel: 704-355-2639; fax: 704-355-7203.

Pre- and Postdoctoral Positions. The Channel/Receptor/Transporter group (CRTG) at UC, Irvine (including the labs of M. Cahalan, K. G. Chandy, J. Gargus, A. Goldin, G. Gutman, J. Hall, and D. O'Dowd) has an active, multidisciplinary research program with a major focus on ion channels and substantial links with the pharmaceutical industry. The CRTG has attempted to create a training environment that encourages interactions between electrophysiologists, molecular biologists, cell biologists, and protein chemists. Trainees present their research in monthly group meetings. A major emphasis of our training program is to produce scientists equipped to work in either industrial or academic environments.

Applications are invited for six postdoctoral positions: 1) protein chemist to pursue the biochemical characterization and purification of ion channels for direct structural studies, 2) electrophysiologist to work on reconstitution and characterization of the biophysical properties of purified ion channels, 3) electrophysiologist to use site-specific mutagenesis along with patch-clamp methodology to delineate the structure of channel pores, 4) electrophysiologist to examine the role of alternative splicing in the regulation of ion channel function using whole cell recording and single cell PCR, 5) molecular biologist with an interest in defining the regulatory elements that control ion channel expression, and 6) cell physiologist to use video-imaging techniques to study cell signaling mechanisms. Applications are invited for six predoctoral positions to join an Ion Channel/Transporter/Signaling focus group.

Send curriculum vitae and names of three referees to: Mona Wapner, Department of Physiology and Biophysics, D340 Medical Sciences Building I, University of California, Irvine, CA 92717.

Postdoctoral Position in Physiology. A postdoctoral position is immediately available to join an active research group studying the neurohumoral regulation of the airway functions. Current studies are focused on 1) physiological and pharmacological properties of chemosensitive afferent endings in the airways and lungs; 2) neurogenic mechanisms of bronchial hyperreactivity caused by epithelial injury and inflammation; and 3) the role of endogenous inflammatory mediators, neuropeptides, and oxygen radicals in regulation of airway response to inhaled irritants. Background in respiratory physiology or/and neuroscience is desirable. Salary competitive and commensurate with experience. Applications accepted until position filled. Please send resume and names of two references to Lu-Yuan Lee, PhD, Department of Physiology, University of Kentucky Medical Center, Lexington, KY 40536-0084. Tel: 606-323-6339; fax: 606-323-1070. Minorities and women are encouraged to apply. EOAAE.

Research Associate. The Department of Biological Sciences is searching for a Research Associate 2 with a Ph.D. (or M.S. with extensive research experience) in one of the Biological Sciences (Biology, Zoology, Physiology, Molecular Biology) required. The project will include the molecular and physiological characterization of the Ca pump using a comparative (invertebrate) model. Candidates should have significant research background in general molecular and physiological techniques including the following: gene cloning and sequencing, enzyme kinetics, ion transport. First consideration will begin October 15 and the search will continue until the position is filled. Send curriculum vitae and names of two references to Dr. Michele G. Wheatley, Professor and Chair, Department of Biological Sciences, Wright State University, Dayton, OH 45435. Wright State is an Affirmative Action/Equal Opportunity Employer.

Positions Available

There is a \$50 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. Listings will remain on the APS Information Server for 3 months.

A check or money order payable to the American Physiological Society must accompany the position listing. Purchase orders will not be accepted unless accompanied by payment. Ads not prepaid will not be printed. Copy must be typed double spaced and is limited to 150 words. All copy is subject to the editorial policy of *The Physiologist*. EOAAE indicates Equal Opportunity/Affirmative Action Employer and appears only when given on original copy. Copy deadline: copy must reach the APS office before the 15th of the month, two months preceding the month of issue (e.g., before February 15th for the April issue). Mail copy to APS, The Physiologist, 9650 Rockville Pike, Bethesda, MD 20814-39911.

Molecular Biology of the Skin: The Keratinocyte

Michel Darmon and Miroslav Blumenberg, Editors. New York, NY: Academic Press., 1993, 291 pp., illus., index, \$85.00. ISBN: 0-12-203455-4

It seems the skin has always been on the fringe of the major thrust of molecular biology research, overshadowed by more predominant model systems like the brain or liver. The skin, as Werner Franke puts it in the forward of *Molecular Biology of the Skin: The Keratinocyte*, "is a peripheral organ, and for generations of students and researchers it has also been a bit in the periphery of general interest...". This is of course unfortunate, since there are few organ systems that offer such a great opportunity to study basic biological processes such as cellular differentiation and the regulation of gene expression and that have such an application to human disease. Thus, this book sets out to reclaim some of the limelight for skin research by bringing us up to date with the latest in the cellular and molecular biology of the epidermis.

The book is divided into nine chapters, each by a different set of authors and each designed to either review a long-established field of skin research or highlight emerging fields of active research. For instance, in the first two chapters Blumenberg and Schwezen review the molecular structure and regulation of the keratin gene family of human and mouse, respectively. In another chapter, Blumenberg focuses on retinoic acid as a signal for epidermal differentiation, and a chapter by Carroll et al. explores the possibility of gene therapy in keratinocytes. Such an organization serves the dual purpose of introducing the novice to epidermal molecular biology and, at the same time, keeping a skin researcher abreast of new developments in ancillary fields. This second goal is often difficult to accomplish in this type of format, since there is always a delay from when the chapter is written to the actual publication of the book. Yet the editors appeared to make this volume as current as possible, as witnessed by the appearance of references from as late as 1993. In the end, the real and more general value of this book may be as a reference source for those scientists not working on the skin directly. For example, it would be useful for retinoic acid researchers to know the role of retinoic acid in epithelial and epidermal differentiation and gene expression.

Each of the first five chapters reviews a major area of epidermal research. Chapters 1 and 2 deal with the organization of the human and mouse keratins genes, respectively; the characteristics of their intermediate filament proteins; and the regulation of their gene expression. This is a tremendous amount of data to go through. The authors attempt to organize these chapters in a straightforward manner so as not to lose the reader in too much minutia and at the same time avoid omitting any information. This is less true of the second chapter on mouse keratins, where there is an exhaustive section on each of the mouse keratin proteins. To a degree this is understandable, since there is probably more experimental results using mice as a model system to study the epidermis. This chapter eventually broadens its focus by including sections on keratin gene expression in various mouse tumors. The next three chapters deal with genes and cellular phenomena that are unique to epidermal function, specifically the formation of the cornified envelope. The chapters are extensive about their respective subjects: filaggrin, the protein involved with the packing of keratin filaments (Dale et al.); cornificathe protective barrier of the epidermis (Reichert et al.); and loricrin, a major precursor protein of the cornified envelope (Hohl and Roop). The authors do a good job reviewing background material and then focusing the reader's attention to their own lab's contribution to these subjects. There is a large amount of information in this area, and it is presented in a well organized manner without the reader needing much prior knowledge of epithelia morphogenesis. The remaining four chapters emphasize studies in the epidermis

tion, in which keratinocytes differentiate into corneocytes forming

that deal with subjects that have a broader scope in molecular biology. For example, Darmon and Blumenberg's chapter on the role of retinoic acid in epidermal differentiation begins with a review of retinoic acid receptors and responsive elements. The chapter by Cavard et al. on transgenic mice includes short reviews of this technology along with gene knockout technology. Although some of these reviews may be unnecessary for those researchers familiar with these techniques, it would certainly aid the inexperienced researcher attempting to be brought up to date with the most current technology used in skin research today. The strength of the transgenic mouse and gene therapy chapters is that it gives the reader a sense of where the field of skin research is heading and the type of questions that can be addressed using these new technologies. The last chapter on gene therapy in keratinocytes (Carroll et al.) is, not surprisingly, one of the shortest chapters, since there is limited amount of data available in this area. However, this is the field that promises to be very exciting because of the obvious application of correcting diseases in the human epidermis, for example through the expression of a wild type copy of a DNA repair enzyme gene in skin that has the inherited defect xeroderma pigmentosum. Although this chapter is written carefully, much of it is proposals for how gene therapy in the epidermis could be accomplished. It must be remembered that at this time there is no way to enrich a epidermal culture for stem cells, which are required to transfer the correct copy of the gene to the patient's skin. Thus, gene therapy is not around the corner but may be visible on the horizon.

The editors organized the book well by ensuring that the contributors included solid reviews before describing the newest advances in their respective areas of research. This book, then, is a resource for the field of molecular biology of differentiation.

Peter M. Mathisen The Cleveland Clinic Foundation

Fetus and Neonate Physiology and Clinical Applications: Volume I: The Circulation

Mark A. Hansen, John A. D. Spencer, and Charles H. Rodeck, Editors.

New York, NY: Cambridge University Press, 1993, 438 pp., illus., index, \$110.00, hardcover; \$39.95, paper

This is the first volume in a series on the applications of fetal and neonatal physiology to clinical medicine. The multiauthored book is timely with respect to its focus on the circulation, especially since diagnostic and treatment approaches to the fetus with cardiovascular disease are now both a reality and an everexpanding clinical domain. Thus, this book, which relates some of the more important advances made in our understanding of developmental cardiovascular structure and function, is a welcome addition to the recent literature. The last treatise seeking to deal comprehensively with fetal and neonatal cardiovascular development, authored by Geoffrey S. Dawes, was published more than 20 years ago, which provides yet another reason to appreciate the publication of this text.

The book is divided into three sections, which deal with physiology, then pathophysiology, and last clinical applications. While not designed to be totally comprehensive, each section demonstrates the clear linkages between research advances in fetal and newborn biology and clinical medicine.

The first seven chapters of the current publication provide a basic framework for understanding those integrated cardiocirculatory responses during normal development prerequisite to understanding alterations induced by disease states and changes in the physical and chemical milieu before and after birth. The subjects in the physiology section of the book include heart rate and blood pressure control in the fetus, regulation of in utero blood volume and the regional distribution of cardiac output, local and endocrine factors involved in controlling the perinatal circulation, structural organization and physiology of the fetal-placental circulation, characterization of the intrinsic physiological properties of the developing heart from embryonic to fetal life, the transition at birth of the circulation, and control of the neonatal circulation. The chapters on pathophysiology deal with some of the most prominent challenges to the fetus and newborn, including the cardiovascular effects of acute fetal hypoxia and asphyxia, the influence of chronic hypoxemia on circulatory control, the important issue of persistent pulmonary hypertension in the newborn and its prenatal antecedents, and, finally, the relationship between fetal size at birth and adult blood pressure.

The last section of this book focuses on clinical applications and is of especial value to the perinatal cardiologist. The section describes in good detail fetal heart rate monitoring and the pivotal role of 2D echocardiographic and Doppler ultrasound analysis of normal and abnormal development of the circulation. In this regard, the approaches to the analysis and assessment of structural and functional anomalies of the heart as well as of cerebral hemodynamics and oxygenation in the newborn infant are dealt with in reasonable depth, as is the management of specific fetal cardiac anomalies. The final chapter provides a thoughtful approach to the principles of diagnosis and management of persistent pulmonary hypertension of the newborn. This last chapter, like many of the others, was completed prior to the very recent explosion of significant new information about the biology of the fetus and newborn, including, but not limited to, the emergence of an understanding of the importance of nitric oxide and other mediators in the control of regional vascular beds at all stages of development and postnatal life.

The editors have chosen the chapter contributors wisely, and each author is a recognized expert in his/her area of interest. The book serves the valuable purpose of reviewing current knowledge and stressing the key importance of a multidisciplinary spectrum of research involving physics, molecular biology, biochemistry, obstetrics, neonatology, pediatric cardiology, etc., which form the basis for integrated concepts of fetal and neonatal cardiocirculatory physiology. One of the best features of this book is its broad applicability to students at all levels of interest and training, including the undergraduate and the medical student, the clinical trainee and pre- or postdoctoral fellow, and the senior scientist and clinician. I await the publication of additional volumes in this series with great interest. William F. Friedman University of California, Los Angeles

Visual Search 2

David Brogan, Alastair Gale, and Karen Carr, Editors Bristol, PA: Taylor & Francis, 1993, 477 pp., illus., index, \$99.00.

Visual attention is a booming field. In neuroscience, work from the labs of Bob Desimone, John Maunsell, Peter Schiller, and others shows us in increasing detail how the responses of single neurons change as a function of the attentional demands placed on a monkey. Some (including, I gather, Francis Crick in his new book) see attention as a key to unlocking the relationship of neural events and conscious experience. At some scientific distance from these reductionist and theoretical issues is a set of practical, real-world problems involving visual attention. As visual organisms, we are usually faced with a visual world crowded with things to look at and/or attend to. We can't process everything everywhere at the same time. At the most trivial level, some stimuli cannot be processed because they lie outside the current field of view. In this case, eve, head, or body movements can be used to select different sets of stimuli for analysis. Sometimes things are hidden in places where people cannot or do not want to go (e.g., the ocean floor or the inside of an oil tanker), so we can search by moving a remote sensor and sending the output to a human in a more comfortable location. Even within the field of view of the moment, it is generally impossible to identify multiple objects in parallel at different locations in the visual field. This probably reflects the need to save some neurons for functions other than vision. Covert movements of attention, occurring without the need for eye movements, can be used to select a restricted piece of the visual field for the detailed processing required for identification.

The present volume, Visual Search 2, covers a portion of the field, including the study of eye movement "scan paths," covert movements of the spotlight of attention, machine vision solutions, and specific search problems. It is not the place to look for a discussion of the neuronal substrate or of the broad theoretical implications of attentional research (with the exception of Anderson and Van Essen's chapter on their effort to model search and attention in an explicitly neurophysiological context). However, this book provides a wealth of interesting material for a reader interested in human experimental work and its theoretical analysis. Because Visual Search 2 is the proceedings of a conference held in Durham, UK, in September 1990, the book is composed of a set of short chapters. each dealing with a different, quite specific aspect of visual search. The individual papers, a number of them very good, stand alone. The strength of the book is that the collection paints a picture of the state of the field as a whole. No particular effort was made to tie the material together.

The book opens with two very fine invited papers, one by Jacob Beck and the other by Lawrence Stark et al. The Beck article is a review of his interesting series of experiments on texture segmentation. It describes his work on spatial frequency models of texture segmentation (done with Anne Sutter and Norma Graham) and his related work on the groupings of elements by colinearity, common luminance, and other factors. His newest work deals with groupings by 3D interpretation. Beck's article also serves to place his work in the broader context of other work in the field.

The chapter by Stark et al. begins with a look at the theoretical underpinnings of the problem of search. The chapter does not review this work in any detail. Rather, it provides a quick overview with bibliographic pointers. The bulk of the chapter is devoted to the authors' recent work on eye movement scan paths, a topic they have explored for many years. The project described here involves search with a head-mounted display and stimuli that are either random 2D patterns or meaningful 3D scenes. The paper makes a good bridge between basic vision science work and more applied work, both of which are represented in the six groups of contributed papers that follow.

The first group of contributed papers is on modeling. It includes good short accounts of Muller and Humphrey's SERR model of visual search and of Enns and Rensink's model developed to account for their discovery that a number of pictorial depth cues can be processed in parallel. Some of the other papers, like Wallace and Brodie's paper on object recognition, are interesting but seem a bit remote from the core problems of visual search.

The second group of contributed papers on "feature discrimination" covers quite a range, from Tara Callaghan's basic science paper on the interactions between stimulus features in covert attention search tasks to Lewis and Dobie's paper on machine vision tools for getting object information out of video data bases. The papers in the third group turn to one specific applied problem: searching medical images. Scanning radiological images for tumors is a classic example of a medical search problem. As the papers in this section make clear, it is a hard problem with constraints different from basic science search tasks. For instance, the 5-10% miss rate tolerated in lab search tasks has serious consequences in the search for a tumor. Perhaps, as Astley et al. suggest, this is a venue where human and machine can work together to perform better than either can alone. Space precludes a systematic discussion of all of the 37 chapters in *Visual Search 2*. There is, as they say, something for every taste. Vickers looks at eye movements in golf. Weirda and Maring compare the search behavior of child and adult cyclists. There are a number of interesting papers in the section on visual processing, including an intriguing paper by Hagenzieker and Van der Heijden showing different effects of a luminance cue on localization and identification tasks.

The final section presents a series of applied search problems ranging from detection of misprints in Japanese (Yokosawa and Shimomara) to making decisions in soccer (Helsen and Pauwels). Smets and Overbeeke present an interesting paper combining visual search and virtual reality, in this case, using a robot to clean out the inside of the oil tanker. Finally, we have my favorite applied task: Desnoyers and Dumont have been studying the search strategies of miners in Quebec, Canada. They operate in darkness except for the narrow (5°) beam emitted by their caplamps. Finally, someone has truly found the spotlight of attention in visual search tasks.

So, who should pick up this book? The conference took place in 1990, so it is not really the place to look for the most current of current events. Nevertheless, the book is a good place to look for short versions of material more extensively described elsewhere (e.g., Muller and Humphrey's SERR model). I believe that the best reason to examine the book is to get some grasp on the range of the behavioral problems in the field. *Visual Search 2* is not a systematic survey of the field. The list of authors and even the bibliography miss virtually all of the neurophysological work, but most of the labs doing human experimental work can be found in the references. Moreover, if one reads just the basic vision or neuroscience journals, one will never come across visual search in a mineshaft.

> Jeremy M. Wolfe Brigham and Women's Hospital, Harvard Medical School

BOOKS RECEIVED

Advances in Psychophysiology, Volume 5. J. Richard Jennings, Patrick K. Ackles, and Michael G. H. Coles (Editors). Bristol, PA: Jessica Kingsley Publishers, 1994, 305 pp., illus., index, \$99.00. ISBN: 1-85302-191-1.

A Practical Guide to the Study of Calcium in Living Cells, Volume 40. Richard Nuccitelli (Editor). Methods in Cell Biology. San Diego, CA: 1994, 368 pp., illus., index, \$45.00. ISBN: 0-12-522810-4.

The Tachykinin Receptors. Stephen H. Buck (Editor). Totowa, NJ: Humana Press, 1994, 630 pp., illus., index, \$125.00. ISBN: 0-89603-266-3. Essays in Biochemistry, Volume 28. K. F. Tipton (Editor). London, UK: Portland Press Ltd., 1994, 169 pp., illus., index, \$30.00. ISBN: 1-85578-016-X.

The Human Brain Circulation: Functional Changes in Disease. Rosemary D. Bevan and John A. Bevan (Editors). Totowa, NJ: Humana Press, 1994, 470 pp., illus., index, \$89.50. ISBN: 0-89603-271-X.

The Molecular Basis of Smell and Taste Transduction. Derek Chadwick, Joan Marsh, and Jamie Goode (Editors). Ciba Foundation Symposium 179. Somerset, NJ: John Wiley & Sons, 1994, 287 pp., illus., index, \$72.00. ISBN: 0-471-93946-3. Renal Ammoniagenesis and Interorgan Cooperation in Acid-Base Homeostasis. A. Tizianello. G. Baverel, H. Endou, A. C. Schoolwerth, and D. J. O'Donovan (Editors). Contributions to Nephrology, Volume 110. G. M. Berlyne and S. Giovannetti (Series Editors). Basel, Switzerland: Karger, 1994, 184 pp., illus., index, \$149.00. ISBN: 3-8055-5915-1.

Electrogastrography: Principles and Applications. Jiande Z. Chen and Richard W. McCallum (Editors). New York, NY: Raven Press, 1994, 447 pp., illus., index, \$90.00. ISBN: 0-7817-0213-5.

NIH Seeks Advice on Grant Streamlining

After a year of experimenting with schemes to streamline grantmaking, the NIH is asking grantees to comment on proposals that could change the way they do business with the agency for years to come. A notice in July 1, 1994, *NIH Guide to Grants and Contracts* requested comments on procedural revisions under current consideration and suggestions for other modifications to speed grants processing and reduce grantee and staff workloads. Following are key areas in which NIH is seeking advice from the field.

Triage. A major proposal to streamline peer review would institutionalize triage across NIH. Triage eliminates obviously noncompetitive applications from consideration early in the review process, reserving full review and discussion for only the best proposals. Expanded pilot studies currently under way feature quick return of noncompetitive proposals and reviews' critiques to researchers so they can get a head start on reworking them for resubmission.

MERIT expansion. NIH is also exploring whether to adopt a process by which review would place greater emphasis on the investigator to be supported than on the specifics of the project. The approach would be similar to that now taken with the MERIT award, a mechanism used to provide long-term support to investigators with superior track records. The grant emphasizes looking at investigators' accomplishments rather than potential.

Modular grants. A scheme still in the rough would simplify the grants award process by presetting grant levels; for example, \$150,000 or \$250,000, depending on factors such as scope and level of effort. Applicants would apply for a set amount based on overall needs rather than on specific budget categories.

Just in time. NIH is also considering an initiative to reduce the burden of providing grant application material unless it is necessary. Under current pilot tests, NIH is requesting certain information, including detailed budget and biographical data, of only the 25% or 30% of applicants with a fair chance of funding.

Information: Wendy Baldwin, Extramural Research, National Institutes of Health, Bldg. 1, Room 144, Bethesda, MD 20892. Respond by fax (301-402-3469) or e-mail (lef@cu.nih. gov).

Supplements to Promote Reentry Into Biomedical and Behavioral Research Careers

The NIH announces a program for administrative supplements to research grants to support individuals with high potential to reenter an active research career after taking time off to care for children or parents or to attend to other family responsibilities. The aim of these supplements is to encourage fully trained individuals to reenter research careers within the missions of the program areas of the NIH. This program will provide administrative supplements to existing NIH research grants for the purpose of supporting full-time or part-time research by these individuals in a program geared to bring their existing research skills and knowledge up to date.

The NIH recognizes the need to increase the number of women and minorities and people with disabilities in basic, behavioral, and clinical science research careers. Among the reasons for the low representation of women may be the fact that women bear a majority of the responsibilities surrounding child and family care. To address this issue, this program is designed to offer opportunities to women and men who have interrupted their research careers to care for children or parents or the attend to other family responsibilities. The objective of the program is for those who receive support to reestablish careers in biomedical or behavioral research.

Candidates must have a doctoral degree or equivalent, at least two years of postdoctoral research experience, and sufficient prior research experience to qualify for a faculty appointment at the assistant professor or equivalent level. Candidates who have begun the reentry process through a fellowship or similar mechanism are not eligible for this program.

In all cases, the proposed research must be directly related to the funded approved ongoing research of the parent grant or cooperative agreement. The individual supported under this supplemental award must be afforded the opportunity to act as a full participant in the research project and must be given an opportunity to update and enhance his/her research capabilities. This will allow the candidate to begin the process of establishing or reestablishing a career as an independent, competitive research investigator. Supplemental awards will be consistent with the goals of strengthening the existing research program and with the overall programmatic balance and priorities of the funding program of the NIH. Awards will be made according to the policies and provisions stated in this announcement and in the PHS Grants Policy Statement (rev. 10/90).

A request for a supplement may be made at any time during the funding year, providing there will be two full years of funding remaining for the parent grant at the time of funding. In making requests, the grantee institution, on behalf of the Principal Investigators, should submit the request for supplemental funds directly to award component that supports the parent grant.

General information: candidates and Principal Investigators should contact the program official of the appropriate awards Institute or Center. Candidates who have yet made contact with a Principal Investigator are encouraged to contact the program official whose institute or center is specific to the research interest.

NIH Guide for Grants and Contracts Electronic Distribution List

There have been two changes in the LISTSERV distribution of the NIH Guide: NIHGDE-L is now an open list, and the Table of Contents list is now established.

The NIHGDE-L list is now open for subscriptions from individuals. To minimize the possibility of errors, it is best for each person to subscribe him/herself to the list. Subscribing and unsubscribing to/from a list is done via e-mail. BITNET users should send mail to LISTSERV@JHUVM and Internet users to LISTSERV@JHUVM.HCF. JHU.EDU. To subscribe to the E-Guide List, the text of the mail should be "SUBSCRIBE NIHGDE-L First-name Last-name". The first and last names, should be in upper and lower case; e.g., "SUBSCRIBE NIHGDE-L Bill Jones". This will register the e-mail address from which the mail was sent for E-Guide distribution. If you wish to have the E-Guide sent to an address from which mail cannot be sent (e.g., an internal distribution list), send mail to WKJ@NIHCU (BITNET) or WKJ @CU.NIH.GOV (Internet). To remove yourself from this list, send mail to LISTSERV@JHUVM (or LISTSERV @JHUVM.HCF.JHU.EDU) containing as the text "UNSUBSCRIBE NIHGDE-L".

Some users who subscribed to the NIHGDE-L list had problems with the volume of mail that was received each week. They would prefer to see a table of contents and access the NIH Guide files via Gopher when necessary. For that purpose, the NIHTOC-L list has been established at the NIH. It will contain only the table of contents for each week's NIH Guide. It is an open list that one can subscribe to by sending mail to LISTERSERV@NIHLIST or LISTSERV@LIST.NIH.GOV (Internet). The mail should contain as text "SUBSCRIBE NIHTOC-L First-name Last-name". If you do subscribe to the NIHTOC-L list and are already subscribed to the NIHGDE-L list, you will probably want to UNSUBSCRIBE from that list.

Inquiries: Myra Brockett, Institutional Affairs Office, National Institutes of Health, Building 1, Room 328, Bethesda, MD 20892. E-mail: Q2C@NI-HCU or Q2C@CU.NIH.GOV.

LSRO Reports Available

The Life Sciences Research Office (LSRO) of FASEB has completed five reports. These reports were completed by Expert Panels convened by the LSRO.

The Evaluation of the Safety of Using Psyllium Seed Husk as a Food Ingredient includes a review of studies of biological effects of a processed form of psyllium seed husk proposed for use as an ingredient in grain-based foods. The report, prepared for Kellogg Company, Battle Creek, MI, also provides estimates of consumer exposure to the substance if used as a food ingredient and conclusions of the Expert Panel regarding possible health effects resulting from its use in food. This evaluation is part of a continuing series of scientific assessments by LSRO concerning the health aspects of food ingredients that may be Generally Recognized as Safe (GRAS) food substances by the US Food and Drug Administration. Price: \$55.00.

The Evaluation of the Health Aspects of Using Certain Triacylglycerols as Food Ingredients was prepared for the Nabisco Foods Group, RJR Nabisco. The report includes a review of studies of biological effects of a family of structured triacylglycerols prepared by esterification of triacetin, tripropionin, or tributyrin with hydrogenated derivative of canola, soybean, or cottonseed oils. The report also provides estimates of consumer exposure to the substances if used as food ingredients. The conclusions of the Expert Panel support GRAS classification as food ingredients. Price: \$55.00.

The Evaluation of Evidence for the Carcinogenicity of Butylated Hydroxyanisole (BHA) was prepared for the Center for Food Safety and Applied Nutrition, Food and Drug Administration. In reviewing the scientific studies on possible carcinogenicity of BHA, the Expert Panel observed that the majority of short-term genetic test are negative, that positive results are limited to the forestomach tissues of the rat and hamster following exposures to relatively high does of BHA for periods of several months, and that BHA at comparable doses counteracts the action of known carcinogens in several animal models. The Expert Panel found no substantiated evidence of hepatocarcinogenicity in the hermaphroditic fish Rivulus. Price: \$24.00

The Evaluation of the Energy of Certain Sugar Alcohols Used as Food Ingredients was prepared for the Calorie Control Council. The Expert Panel examined data on hydrogenated starch hydrolysates, isomalt, lactitol, maltitol, mannitol, sorbitol, and xylitol in the course of their study. They found that exact values for metabolizable or net energy for each of the sugar alcohols could not be determined; however, approximate ranges were derived. The Expert Panel found that accurate measurements were affected by various experimental conditions such as the amount ingested, whether it was eaten alone or with a meal, as well as the potential contribution to net energy from fermentation in the colon. Price: \$50.00.

The Evaluation of the Scientific Evidence for a Relationship Between Calcium and Hypertension was authorized by Pavel Hamet and was prepared by the LSRO for the United Dairy Industry Association, Chicago, IL. It examines the scientific literature since 1987 on the relationship between dietary intake of calcium and the etiology and prevention of hypertension. The report concludes that scientific evidence suggests a beneficial effect of dietary calcium at recommended levels in prevention of hypertension, particularly during pregnancy. However, the lack of consistency in results of intervention trials precludes any conclusions about the use of calcium supplements for the prevention or treatment of hypertension. Price: \$25.00.

The reports are available prepaid from the FASEB Special Publications Office, 9650 Rockville Pike, Bethesda, MD 20814-3998. (Maryland residents, please add 5% sales tax.)

Fewer Young Life Scientist Seek Federal Research Support

Are fewer young researchers pursuing careers in the biological sciences? Or are they simply choosing careers in industry that do not require federal support? A new report from a committee of the National Research Council (NRC) has found that, during the part decade, the number of life scientist younger than 37 applying for research grants from the NIH has plummeted more than 50%.

About 700 fewer young scientists are conducting NIH-supported research today than were during the mid-1980s. The reasons for this decline are not yet known—it was recognized only recently during the committee's analysis of new data about the NIH's grants for FY 1993. The pattern is so striking that the NRC is developing plans for a new study to determine its cause.

Meanwhile, many scientists are concerned that overall cuts in the government funding have had a disproportionately negative effect on people beginning their careers as independent researchers. But the committee found that biological and biomedical researches in *all* age groups have more difficulty today obtaining government research funds than in the early and mid-1980s. During that period, researchers younger than 37 held a slight advantage over scientists in other age groups. Now they are no more likely to receive federal funds than are their older peers.

The committee's study was sponsored by the Markey Charitable Trust Fund, the NRC, the NIH, National Science Foundation, US Department of Energy, and US Department of Defense. The NRC is the operating arms of the NAS and the National Academy of Engineering. It is a private, nonprofit institution that provides independent advise on science and technology issues under a congressional charter.

Copies of *The Funding of Young Investigators in the Biological and Biomedical Sciences* are available from the National Academy Press at 2101 Constitution Ave., NW, Washington, DC 20418 for \$24.00 (prepaid) plus shipping charges of \$4.00 for the first copy and \$0.50 for each additional copy. Tel: 202–334-3313 or 1-800-624-6242. Reporters only may obtain copies from the Office of News and Public Information at the above address. A committee roster is attached.

Videotape on Ethical Dilemmas

A one-hour educational videotape, "Ethical Issues in Scientific Research" (ISBN 0-9643022-0-9), provides a panel of scientists from academia, industry, and government who deal with ethical dilemmas of scientific issues such as authorship practices, peer review, data reporting, social responsibilities of research, research fraud, and the role of the media in forming the public of scientific advances. It is being made available by the Research Triangle Park Club of Sigma Xi. *Information:* Harvey Krasny, PO Box 13068, RTP, NC 27709-3068. To purchase a copy or a site license, call 800-768-4336-4336 or 803-269-7744.

IUPS Appoints International Program Committee

During May 1994 the Executive Committee of the International Union of Physiological Science (IUPS) Council (President: M. Ito, Vice Presidents: F. Neher and F. Weibel, Treasurer: H. Sparks, Secretary General: D. Noble, Executive Secretary: S. Orsoni) met in St. Petersburg, Russia. One of the purposes of the meeting was to discuss the organization of the St. Petersburg Congress, scheduled for July 1997, with the Russian Organizing Committees. These meetings were very successful, and the Executive Committee left St. Petersburg feeling enthusiastic about the approach being taken by the Russian Committees. There are, inevitably, some difficulties given the present rapidly changing situation in Russia, but we were favorably impressed by the way in which the Russian organizers are overcoming these and, indeed, seeking to build on the work done at the 1993 Glasgow Congress. If Glasgow was a "date with the future of physiology," then St. Petersburg already shows signs of being its realization!

The location is one of the most spectacular of cities with its palaces, museums (including the world-famous Hermitage), and theaters (including the Kirov Opera and Ballet). Restaurants using Western currency are already beginning to appear, and a wide range of accommodation, from the least expensive student housing to luxury hotels, is available. The exact location of the Congress within the city is still being discussed, but it is likely that a single academic site will be used, thus overcoming one of the disadvantages of the two-site arrangement found in Glasgow.

Following the meeting, Council approved the membership of the International Scientific Program Committee for the 1997 Congress. Their names together with those of the Russian members of that Committee are listed below. Ideas and suggestions for the 1997 Congress are welcome and should be communicated to the Committee Chair or Vice-Chair no later than January 1, 1995. Ideas can also be discussed with any of the members who is more convenient. The Program Committee will meet in St. Petersburg in May 1995 when the broad outlines of the program for the 1997 Congress will be settled.

D. Nobel Secretary General, IUPS

All correspondence concerning proposals for the Scientific Program of the IUPS Congress should be addrressed to the Congress Secretariat, CONGREX, the official organizer: IUPS 1997, c/o CONGREX, P.O. Box 35, FIN-00621 Helsinki, Finland, Telephone: +358-0-752 3611, Fax: +358-0-752 0899.



The IUPS Executive Committee on the grounds of Institute of the Human Brain in St. Petersburg in front of a statue of Pavlov's dog. First row (l-r): E. Ohmberg (Congrex), P. Simonov (Chair, Local Scientific Program Committee), M. Ito (IUPS President), D. Noble (IUPS Secretary), O. Hannien (Organizing Committee), E. Weibel (IUPS Second Vice President), H. Sparks (IUPS Treasurer), S. Orsoni (IUPS Executive Secretary). Second row (l-r): E. Neher (IUPS First Vice President), J. Saari (Congrex). Absent from picture: S. Medvedev (Chair, Organizing Committee).

International Scientific Program Committee							
Simonov, P. (Russia), Chair	Neuroscience						
Schultz, S. (USA), Vice-Chair	Membrane Transport						
Cowley, A. (USA)	Integrative						
DiPrampero, U. (Italy)	Respiration						
Dockray, G. (UK)	Gastrointestinal						
Earm, Y. (Korea)	Muscle						
Efuni, S. (Russia)	Respiration						
Greger, R. (Germany)	Renal						
Lamb, T. (UK)	Neuroscience (Peripheral)						
MacKnight, A. D. C. (New Zealand)	Cell						
Medvedev, S. (Russia)	Neuroscience						
Mereer, J. (Norway)	Thermal						
Natochin, Yu. (Russia)	Renal						
Ostrpvsky, M. (Russia)	Neuroscience						
Pfaff, D. (USA)	Endocrinology						
Sasaki, K. (Japan)	Neurosceince (Central)						
Tkachenko, B. (Russia)	Circulatory						
Weingart, R. (Switzerland)	Cardiovascular						
Consultants							
Ito, M. (Japan)	President, IUPS						
Nobel, D. (UK)	Secretary General, IUPS						

Scientific Meetings and Congresses

Engineering Advances: New Opportunities for Biomedical Engineers (16th Annual International Conference of IEEE Engineering in Medicine and Biology Society), November 3-6, 1994, Baltimore, MD. Information: IEEE/EMBS Conference Office, Meeting Management, 2603 Main Street, Suite 690, Irvine, CA 92714. Tel: 714-752-8205; fax: 714-752-7444.

New Frontiers in Surgery, NIH Office for Protection from Research Risks Workshop, December 1-2, 1994, Sheraton Charleston, Charleston, SC. *Information:* M. Michael Swindle, MUSC/Comparative Medicine, 171 Ashley Avenue, Charleston, SC 29425-2211. Tel: 803-723-3000; fax: 803-792-9067.

Australian and New Zealand Society for Comparative Physiology and Biochemistry, December 2-4, 1994, Brisbane. *Information:* Gordon Grigg, Zoology Department, University of Queensland, St. Lucia, Queensland, 4072, Australia. Tel: 617-365-2471; fax: 617-365-1655.

American Society for Cell Biology Annual Meeting, December 10-14, 1994, San Francisco, CA. *Information:* Edward A. Newman, ASCB, 9650 Rockville Pike, Bethesda, MD 20814-3992. Tel: 301-530-7153; fax: 301-530-7139.

International Symposium on Cellular and Molecular Aspects of Angiotensin Receptors, December 10-14, 1994, Gainesville, FL. *Information:* Pia Jacobs, University of Florida, Department of Physiology, PO Box 100274, JHMHC, Gainesville, FL 32610. Tel: 904-392-3991, fax: 904-846-0270.

Considerations for Use of Wild Vertebrates in Research, NIH Office for Protection from Research Risks Workshop, January 12-13, 1995, Westward Look Resort, Tucson, AZ. Information: Terry May, Director of Research Administration, Northern Arizona University, PO Box 4130, Flagstaff, AZ 86011-4130. Tel: 602-523-6788; fax: 602-523-1075.

Scientific Conference on the Functional and Structural Aspects of the Vascular Wall, February 1-4, 1995, Snowbird Conference Center, Salt Lake City, UT. *Information:* American Heart Association, Scientific Conference on the Functional and Structural Aspects of the Vascular Wall, Scientific and Corporate Meetings, 7272 Greenville Avenue, Dallas, TX 75231-4596. Tel: 214-706-1772; fax: 214-373-3406.

Humane Care and Treatment of Animals: Challenges and Changes for the Institutional Animal Care and Use Committee, NIH Office for Protection from Research Risks Workshop, March 12-14, 1995, San Diego Princess, San Diego, CA. *Information:* Danielle Demko, Public Responsibility in Medicine and Research, 132 Boylston Street, Boston, MA 02116. Tel: 617-423-4112, fax: 617-423-1185.

Sixteenth Annual International Gravitational Physiology Meeting, March 19-24, 1995, Reno, NV. Information: Environmental Physiology Laboratory, Karolinska Institute, 171 77 Stockholm, Sweden. Tel: 46-8334012; fax: 46-8339702.

Man in Space for Science and Technology Development, March 27-31, 1995, Toulouse, France. *Information:* IAA BP 1268-16, F-75766 Paris cedex 16, France. Fax: 33-1-47-23-82-16.

Second International Conference, VIDEA 95, June 12-14, 1995, LaCoruna, Spain. *Information:* Audrey Lampard, Conference SecretariatVIDEA 95, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40-7AA, UK. Tel: 44-0-703-293223; fax: 44-0-703-292853.

Third International Conference on Computers in Biomedicine, BIOMED 95, June 21-23, 1995, Centro Congressi of the Palazzo delle Sterlline, Milan, Italy. *Information:* Jane Evans, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA UK. Tel: 44-0-703-293223; fax: 44-0-703-292853; e-mail: CMI@uk.ac.rl.ib.

Second International Meeting on Endothelial Control of Cardiac Performance: Role in Cardiac Failure, June 28-30, 1995, Antwerp, Belgium. Information: Dirk L. Brutsaert, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp-Belgium.

The 1995 Summer Bioengineering Conference, June 28-July 2, 1995, Beaver Creek, CO. *Information:* Kathy Vikers/Robert Hochmuth, Department of Mechanical Engineering and Materials Science, Box 90300, Duke University, Durham, NC 27708-0300. Tel: 919-660-5309; fax: 919-660-8963.

International Union of Biological Sciences, 4th International Congress of Comparative Physiology and Biochemistry, August 6-11, 1995, Birmingham, UK. *Information:* The Secretariat, Universal Conference Consultants, China Court Business Centre, Ladywell Walk, Birmingham B5 4RX, West Midlands UK. Tel: 44-21-622-3644; fax: 44-21-622-2333.

The Federation of European Physiological Societies (FEPS) First FEPS Conference, September 9-12, 1995, Maastricht, The Netherlands. *Information:* Conference Agency Limburg, PO Box 1402, 6201 BK Maastricht, The Netherlands.

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