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Thoughts on Teaching Physiology to Medical Students in 2002

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Introduction

It was a great pleasure and a distinct honor to be selected as the 2002 Arthur C. Guyton Teacher of the Year. My admiration of Arthur Guyton knows no bounds, and it must be very satisfying to him to have written a textbook of physiology that has had such an enormous influence on thousands of medical students over many years throughout the world (1). I still turn to his book when there is a question on some area of physiology that is unfamiliar to me, and am rarely disappointed.

Apparently it is the tradition for the recipient of this award to write a few remarks about the teaching of physiology. Actually I am glad to have this opportunity because I am very involved in teaching physiology to medical students, and there are few occasions where the issues can be discussed. Like most faculty members, I have never had any formal training in teaching, and I can only offer as my credentials the facts that I have been director of the main physiology course for medical students at the University of California San Diego (UCSD) for 30-odd years, and that I have written several books designed to teach physiology to medical students. Moreover, some interesting issues have arisen in the teaching of physiology to medical students over the past 10 or 15 years and I shall discuss five.

Key Role of Physiology in the Medical Curriculum

Never has an understanding of the principles of normal physiology been so important in medical education. As new drugs are introduced, novel diagnostic and interventional techniques are developed, and a better understanding is obtained of how the genome alters function, it is more and more critical for the present-day medical student to understand the principles of both normal and abnormal physiology. This has to be clearly understood in spite of current changes and fashions in medical education. From time to time, legislators emphasize the importance of teaching about aging, cardiopulmonary resuscitation, sex practices, alternative and complementary medicine or whatever, but a clear understanding of how the body works will always be the primary basis of a good medical education. This may sound like bringing coals to Newcastle for the readers of *The Physiologist,* but it is essential to emphasize this fundamental truth at the very outset.

How Much Physiology Should We Teach in 2002?

It may seem odd to raise this issue, but I believe that we have to recognize that the present day medical student cannot be expected to learn as much physiology as was the case 25 years ago. The reason is simply that so much essential new material has entered the pre-clinical medical curriculum, that something has to give. Of course I am not suggesting that all the reduction should be in physiology. Rather it should be shared among all the pre-clinical courses. Naturally, reducing the content of a core course is always difficult. In fact, in our medical school there is continual pressure from some courses to increase the amount of material and expand their courses because this can bolster their case for more resources.

The question of how much physiology should be currently taught to medical students confronted me when I worked on a new book, *Pulmonary Physiology and Pathophysiology: An Integrated, Case-Based Approach* (3). The stimulus for this book is that a number of medical schools now teach pathophysiology along with physiology in a combined course. I am not con-

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vinced that this is the best way to go because there is a danger of glossing over some of the principles of normal physiology (see the section below on case-based learning). However, a number of medical schools have taken this route so it is a fait accompli for some students. In writing the new book, I carefully reviewed the content of my book *Respiratory Physiology-The Essentials* (2), and concluded that about 10 percent of the material in that could be omitted without losing the important principles. Some of the material that was deleted was on pulmonary function tests because, in general, it is far more important to understand the principles of how the lung works rather than how this is measured in pulmonary function laboratories.

I hope I am not leaving the impression that a watered-down course of physiology is acceptable. On the contrary, at UCSD we teach the principles of normal physiology in a rigorous, quantitative way that some schools would probably regard as old fashioned. Also, we should be vigilant to make sure that the time devoted to physiology courses is not unduly reduced as has apparently been the case in some medical schools. However, at the same time, we cannot expect medical students to learn physiology in as much detail as was the case 25 years ago before anybody had envisaged sequencing the human genome.

Do Today's Medical Students have Fewer Quantitative Skills Than 15 Years Ago?

There is a strong impression among the faculty who teach our physiology course that medical students find some concepts in physics and mathematics more difficult than they did 15 years ago. Unfortunately, I cannot document this in any formal way. In fact, when I asked the Dean of Admissions of our medical school about this he was quick to point out that the average Medical College Admission Test (MCAT) score for Physical Sciences of our incoming students this year was 11.3 or the 85th percentile of all applicants admitted to medical schools nationally, and that there has been no decline over the last few years. But the fact remains that students seem to have more difficulty with concepts such as pressure, flow, resistance and elasticity than used to be the case.

Part of the reason for this is probably that the teaching of physics at the college level has been de-emphasized. Friends tell me that this is the case all over the world. Again, to some extent this may be the inevitable result of competing interests. Modern biology emphasizes the spectacular advances in molecular and cell biology of the last 15 years and perhaps it is inevitable that physics and mathematics receive less attention.

The same trend can be seen in the hobbies that students have. While I was growing up, I built radios from scratch, and notions of voltage, current and resistance were taken for granted. Today, very few young people can use a soldering iron, and when a change is made to a piece of electrical equipment such as a computer, this is done by unplugging one unit and replacing it with another. I remember poking around under the hood of our car with my son (now a molecular biologist/pathologist), and noting that he was reluctant to touch the battery terminals. I think he was unsure about the difference between 12 and 110 volts.

The lack of intuition about pressures, flows and resistances leads to curious errors. One of our common questions in respiratory physiology is what happens to pulmonary vascular resistance if the blood flow to one lung is blocked by an embolus or whatever. Some students will argue that of course the resistance of the lung with the occluded artery is increased, but the vascular resistance of the unoccluded side is reduced because the increased blood flow there raises the vascular pressure and, thus, causes recruitment and distension of some capillaries. So far, so good. However, when the student is asked what happens to overall pulmonary vascular resistance (that is, of both lungs together), a significant number will reply that it has decreased! To most of us, it is so intuitive that if you block part of the circulation of the lung the pulmonary vascular resistance has to increase, but some students apparently just cannot see this. This is a relatively trivial example, but many other conceptual difficulties arise when the present day student is introduced to notions of compliance, transmural pressure and surface tension.

It would be interesting to see data on the quantitative skills of incoming medical students as tested by simple mathematical concepts. For example, how many students know that $y = mx + c$ is the equation of a straight line where m is the slope and c is the y-axis intercept? Some apparently do not, judging from the blank looks that greet a mention of this in a lecture. Again, if a student is told that a tank of water develops a hole near the bottom, how likely is he/she to see intuitively that the rate of fall of the water level is proportional to its height, and, therefore, the rate is exponential? It would be nice to have some numbers on this. Of course these concepts are important over a whole range of topics in respiratory, cardiovascular and renal physiology, and are also fundamental in pharmacology for understanding the clearance of drugs from the circulation.

Problem-based Learning and Case-Based Learning

I embark on this topic with some trepidation because I know that feelings run high, and also that others have had far more experience in the field. However, we have had case-based learning sessions in the cardiovascular section of our physiology course for many years, and since the rest of the course is taught in the more traditional way with lectures, discussion groups and laboratories, it is possible to make some comparisons. Possibly these remarks will be of interest to people who are considering moving from one form of teaching to the other.

There is no doubt that many medical students find case-based learning very stimulating and enjoyable. The opportunity of discussing the case his-

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tory of a typical patient together with aspects of the physical examination and some of the laboratory and other investigations is so much more interesting to many students than listening to a lecture, or reading a book chapter on the pulmonary circulation. Good MD facilitators can greatly stimulate the discussion by referring briefly to their own experience in clinical situations. The bright students often do exceptionally well because they can see some of the implications of the discussion well ahead of the other students. Finally, a good case is a great aid to memory, and it is much easier to "remember the postman" rather than "remember our discussion of dynamic compression of the airways."

However, we have had some problems with case-based learning. First, it is enormously expensive of faculty time and this is a major reason why we have only instituted case-based learning in the area of cardiovascular physiology. This is the only area where we have enough faculty members who are sufficiently well-informed about physiology and pathophysiology and are willing to give up the time. Another serious objection, at least in our experience, is that the basic physiological principles tend to get short shrift, and their coverage tends to be spotty. We sometimes hear complaints from students after an exam that a particular topic on which there was a question was not adequately covered in their case-based learning group. In some cases this may be because of uneven expertise of the facilitators. The reduced emphasis on basic physiological principles is understandable because some students find a discussion of clinical aspects much more interesting than equations, graphs, or other ways of looking at the basic principles. A further potential difficulty with case-based learning is that some of the weaker students may be left behind. I have frequently heard this comment when I interview students who have failed one of the exams. They complain that the very bright students tend to dominate the discussion and the material is covered too fast for some of the weaker students to digest it.

One of the buzz words that is tossed around about problem-based and case-based learning is that this is "active" learning, as opposed to "passive" learning of formal lectures. There may be something in this, but a good lecture certainly requires a great deal of active participation by the student if he is to follow the arguments presented by the lecturer. Of course, you can fall asleep during a lecture but this is really a reflection on the lecturer rather than the mode of presenting the material.

I think a good compromise is the use of formal lectures followed by extensive discussion groups, and this is a format that we use extensively. After all, a formal lecture is an extremely efficient way of presenting information to the 125 students or so that we have in a class. The class then breaks up into discussion groups of, say, 12 students each. A series of questions for discussion has previously been prepared and may be structured around a clinical problem. However, the questions themselves deal with basic physiological processes. Each question is assigned to one of the students in the group ahead of time and the assignment is indicated in the syllabus that is given out at the beginning of the course. The appropriate student then presents his/her answer to the question in five to 10 minutes while standing at the blackboard and the other students in the group raise questions. The facilitator sits at the back, at the other end of the room from the blackboard, and only interrupts if it is clear that the student is going off the rails. At the end of the discussion of a question, he may bring out some additional points that have not been covered. Note that this format is also expensive in terms of facilitators' time, but we can use postdoctoral fellows and graduate students as long as they have had some experience with the procedure. In fact, we have them sit in on the sessions for one year's course before they become facilitators in the next. This procedure has some of the aspects of the classical problem-based or case-based learning format because the student has to seek out the answer to the question, but it is more structured in the sense that the questions are prearranged, and the student who discusses the question is identified ahead of time.

Incidentally, sometimes the students ask us to hand out written answers to the questions at the end of the sessions, or put them on the web. Initially we did this but we found that some students obtained the answers from second year students and simply parroted these. Clearly, this defeats the purpose and so we now do not give out the answers to the questions.

Animal Laboratories

We have animal laboratories using anesthetized dogs in the cardiovascular physiology section of the course. Our belief is that direct exposure to the cardiovascular system in this way provides a deeper understanding than can come from textbooks, lectures, films or computer simulations alone. The students are not only able to directly observe the processes of normal integrative physiology but also examine how these are changed by myocardial ischemia, cardiac arrhythmias, and a variety of pharmacological agents that students will administer to patients later in their career. The animals are anesthetized by professional veterinarians in the Animal Care Program and are treated in the most humane way possible.

For those students who have difficulty with a live animal physiology laboratory because of religious, moral, or other reasons, a simultaneous video is provided in an area adjacent to the laboratory. This provides an overview of concepts reviewed in the laboratory, although we do not feel that the video can replace the actual laboratory experience. All the students are brought together several times during the laboratory session to discuss the concepts presented in the live animal laboratory or viewed in the video session. This is done in discussion groups that are the same as those used for the case-based learning sessions. The videos are also made available to the entire class in the Learning Resource Center where they can be played at any time.

In justifying the use of animal laboratories, we emphasize the general importance of the use of animals in medical research, training and education. Almost everyone agrees that animals are essential for medical research. It should also be axiomatic that doctors should train in interventional procedures using animals prior to carrying out these procedures on patients. It is a small step from this to arguing the value of the use of anesthetized animals in teaching physiology.

In conclusion, there is probably no best way of teaching physiology to medical students in the year 2002. Very likely the most effective way depends on a number of factors including the number of faculty available, and the excellence or otherwise of the students. The above remarks simply describe some of our experiences at UCSD, and it may well be that other medical schools will find other formats equally or even more successful. ❖

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1. Guyton AC and Hall JE. *Textbook of Medical Physiology, 10th edition*. Philadelphia: W.B. Saunders, 2000.
2. West JB. *Respiratory Physiology - The Essentials, 6th edition*. Philadelphia: Lippincott Williams & Wilkins, 2000.
3. West JB. *Pulmonary Physiology and Pathophysiology: An Integrated, Case-Based Approach*. Philadelphia: Lippincott Williams & Wilkins, 2001.

Arthur C. Guyton Physiology Educator of the Year Award

The Teaching Section of the American Physiological Society invites you to nominate a fellow physiology educator for the Eleventh Annual Arthur C. Guyton Physiology Educator of the Year Award.

Nominees must be full-time faculty members of accredited colleges or universities and members of the APS. The Selection Committee will look for independent evidence of: *1*) excellence in classroom teaching over a number of years at undergraduate, graduate, or professional levels; *2*) commitment to the improvement of physiology teaching within the candidate's own institution; and *3*) contributions to physiology education at the local community, national or international levels.

In the past, all nominees have shown excellence in teaching at their home institution and many have made significant local contributions through advising, graduate education, or curriculum design and reform. Consequently, the activities that distinguish a candidate in the rankings include outreach activities at the state, national, or international level; contributions to education through APS activities; peer-reviewed educational journal articles; and widely disseminated publications such as commercially produced textbooks, lab manuals, or software.

Each nominee must be nominated by a member of APS. The nominator is responsible for completing the application materials and forwarding six (6) copies of the application materials listed below to the Chairman of the Award Selection Committee, postmarked no later than Friday **December 13, 2002**.

1. A letter from the nominator
2. Letters of support from three other colleagues familiar with the nominee's contributions to physiology education. If possible, one letter should be from the nominee's chairperson. One letter must be from a colleague outside of the nominee's institution
3. Letters of support from up to five current and/or former students
4. Scores on standard student evaluations (with normative data if possible)
5. Details of all teaching honors received (i.e. Golden Apple, Teacher of the Year, etc.)
6. Evidence of education-related activities outside the classroom for which the nominee has achieved national or international reputation. This could include (but is not limited to):

publication of teaching innovations or educational research;

development and publication of laboratory exercises;

development and distribution of teaching software;

authoring of textbooks;

presentation and/or publication of educational research;

conducting seminars, workshops, conferences, etc. on physiology education;

A copy of the nominee's curriculum vitae;

Any additional documentation that would assist the selection committee in evaluating the nominee's contribution to physiology education.

The person selected will receive the award during the APS business meeting at the April 2003 annual meeting of the American Physiological Society (Experimental Biology 2003, April 11-15 in San Diego, CA). The Arthur C. Guyton Physiology Educator of the Year will receive a framed, inscribed certificate, an honorarium of $1,000 and expenses of up to $600 to attend the meeting. The awardee is requested to write an essay on his/her philosophy of education for publication in *The Physiologist*.

The Chairman of the Guyton Award Selection Committee is Michael Levitzky, Department of Physiology Box P7-3, LSU Health Sciences Center, 1901 Perdido Street, New Orleans, LA 70112-1393. Tel: 504-568-6184; Fax: 504-568-6158; Email: mlevit@lsuhsc.edu. ❖

Horwitz Thanks APS Staff

APS President **Barbara A. Horwitz** hosted a staff appreciation reception for the Society's 70 employees at the Bethesda Marriott in Bethesda, MD. Horwitz, APS Executive Director **Martin Frank,** and the rest of the APS Council thanked the staff for their efforts over the past year. She said that APS is able to provide quality programs and services to its membership due to the hard work and support of the staff. Many of the APS committee chairs were also present for the reception and offered thanks to the staff for all the assistance provided to the committees.

A major portion of the staff appreciation reception is the recognition of years of service to the Society. This year, Horwitz presented 15-year certificates to Mona Trang (Peer Review Assistant) and Anna Trudgett (Editorial Manager); 10-year certificates to Eric Pesanelli (Editorial Art Manager) and Alice Ra'anan (Public Affairs Officer); and 5-year certificates to Dell Pillers-Cline (Accounting Manager) and Sue Sabur (Marketing Manager). Horwitz expressed Council's appreciation for their years of service. ❖

APS President Barbara Horwitz and Executive Director Martin Frank presented recognition certificates to Eric Pesanelli, Sue Sabur, Anna Trudgett, Mona Trang, Dell Pillers-Cline, and Alice Ra'anan.

Council Meets in Bethesda

The APS summer Council meeting was held in Bethesda, MD, on July 12-14, 2002. During the meeting Council met with the APS committee chairs. The chairs presented reports of the committees' programs and accomplishments during the past year, and committee plans for the coming year. These committee reports are published in this issue of *The Physiologist*.

At the 2001 summer Council Meeting, a new Communications Committee was established. This summer the Committee presented its first official report to Council. After the Committee was formed, the Society hired the Krupa Company, a public relations firm, and Stacy Brooks, the APS Communications Specialist, to assist the Committee with its efforts to promote APS and physiology. Over the past year the Committee and the Krupa Company have worked on several objectives. They have been working on attracting attention to APS programs, such as the distinguished lectureships and the APS awards program. Additionally, through their efforts, a number of APS journal articles have been featured in the media and several APS conferences have received media coverage. They also reviewed the abstracts that were submitted to EB '02, identified those that may have been of interest to the media, and sent out press releases to both local and national medial outlets. These releases yielded coverage in media outlets such as *Science,* the CBS Radio Network, *WebMD,* and the *Times Picayune* (New Orleans, LA).

The Communications Committee has developed a communications web site that is a resource for both the media and APS members. Posted on this web site is a guide entitled "The Media and You." This guide is available to APS members and is a resource that can help them better communicate with the media. A timeline of physiology is also being developed for posting on the web site.

The Publications Committee continues to strive to provide the highest quality publications with the greatest impact in the life sciences. This is evidenced by the fact that almost all the APS journals had an increase in their 2001 Impact Factors. In October 2001, a new category for submission of papers to the AJP was made available. The "Reports" category is for submissions that are short, original scientific research papers having broad significance. They are not shorter versions of full-length papers. Currently, there are eight submitted papers in peer-review, four have been accepted for publication, and one paper has been published.

At the spring Council Meeting, the Publications Committee was asked to review, with APS legal counsel, the APS Ethical Procedures to ensure that they did not adversely expose APS to legal action in an ethical case. The Committee presented its findings and recommended changes to Council at the summer meeting. The Committee recommended that if an ethical infraction has occurred, the Committee will

refer the matter to the Executive Cabinet for possible sanctions, and if the sanctions are imposed, the author will have the option of appealing the decision to full Council. Finally, work has begun on scanning the content of the APS journals back to 1987 for the first stage of putting all journal content online by the end of 2004. This material will be available free to APS members.

The Career Opportunities in Physiology Committee reported that its session at EB 2002 was well attended. They requested that Council support a careers session at EB 2003. The theme will be opportunities for physiologists in the drug development industry. Various steps in the process, from basic research to approval of new drugs, will be highlighted. Council approved the necessary support for this session. The Committee also reported that the APS Summer Undergraduate Research program has gone very well. In fact, the Committee currently receives more quality applications than can be funded. Although it is too early in the program to determine its long-term success, it has been successful in achieving its short-term goals. The Committee requested, and received, funding to support up to 12 Summer Undergraduate Research Program Fellowships for summer 2003. During the upcoming year the Committee will be directing much of its efforts towards the development of the Careers portion of the APS web site.

In its report to Council, the Section Advisory Committee (SAC) stated that they have developed a time-line to review section awards. This was developed with the goal of ensuring that a single individual does not receive multiple abstract-based awards at the EB meetings. Since individuals will be limited to receiving one award, it is desirable to have the section awards be of similar monetary value to the Society awards (e.g. the Procter and Gamble and tum Suden Awards). Thus, the SAC requested that Council approve funding to provide complimentary advanced registration for all section awards. This would help eliminate some disparities between the section and Society awards. Council did approve the funding needed to provide complimentary registration. The SAC also requested that Council approve the funding necessary to provide complimentary advanced registration for invited speakers for featured topics. They believe this would be a mechanism for promoting participation of speakers in these sessions as well as an inducement for members to organize the sessions.

Reports from the Animal Care and Experimentation, Awards, Finance, International Physiology, Liaison with Industry, Porter Physiology Development, Public Affairs, and Women in Physiology Committees were also presented to Council. The Animal Care and Experimentation Committee (ACEC) organized and presented a Public Affairs Symposium at EB 2002 entitled "Everything You Ever Wanted to Know About the IACUC But Were to Ask." The goal of the session was to provide scientists with focused training in dealing with IACUCs. The session proved to be very successful and a similar session will be presented at EB '03. The Education Committee reported that their programs have been very successful over the past year, especially the "Explorations in Biomedicine" and the "Frontiers in Physiology" programs. Over the next year, the Committee will be developing plans for a series of web-based, self-directed mini-tutorials for graduate and postdoctoral students. The Committee will also be developing plans for an online resource site for medical physiology course directors to be placed in the "Members Only" section of the APS web site. Resources would include information on faculty evaluation, course evaluation, curriculum issues and instructional options.

Back row: Douglas Eaton, Robert Carroll, Curt Sigmund, Steve Hebert, Charles Tipton, Virginia Miller, Dale Benos, and Joseph R. Haywood. Front row: Kim Barrett, John Williams, Barbara Horwitz, John Hall, and Celia Sladek.

In addition to the reports provided by APS committee chairs, the Task Force on Fundraising/Foundations, the Task Force on Trainees, and the Task Force on Awards also presented reports to Council. In its report, the Task Force on Trainees proposed that the APS sections be encouraged to add a trainee member to the Section Steering Committees, and that these trainee members form a Trainee Steering Committee. The goal is to get trainee students more involved

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in the Society and its programs. The charge of the Trainee Steering Committee will be to organize symposia, survey other trainees regarding their needs, staff a trainee help desk at the EB meetings, publish a regular Email newsletter, and establish a trainee page on the APS web site. The Steering Committee will also formulate events, programs and activities to more involve students in the APS.

The Task Force on Fundraising and Foundations has been working on several documents that will be available to the APS membership. The documents are: *1*) "Giving to the American Physiological Society," a draft of a fundraising letter addressed to APS members; and *2*) "Leave a Legacy," a document describing ways in which a potential donor may give to the APS (e.g., bequest, life insurance policy, annuity, etc.). The Task Force also made a proposal to Council that an APS Endowment fund be established.

The Task Force on Awards has been reviewing the APS Awards Program and made several recommendations to Council. The recommendations included enhancing the visibility of the awards and interaction among awardees, to improve the prestige of the Young Investigator and Distinguished Lecturer Awards, and to increase the promotion of the Cannon and Bowditch awards.

For more information on the committees see the Committee Reports section beginning on page 406. ❖

Section News

Introducing Bruce Pitt

Effective April 2002, **Bruce R. Pitt** succeeds **Michael Matthay** as Chair of the Respiration Section of the APS. As a member of APS since 1983, Pitt has served the past three years as Chairman-elect of the Respiration Section and member of the review committee for the Giles F. Filley Award in respiration. Pitt is currently an associate editor of *Am. J. Physiol.: Lung Cell Mol. Physiol*. He has served on the NIH Lung Biology Pathology study section where he was chair (2000-2002), VA Merit Review Respiration, American Heart Association Lung and Development Study Section and American Lung Association Research and Fellowship review committees. He is currently chair of the State of California Tobacco Related Disease Program Pulmonary Study Section. Pitt is also active in the American Thoracic Society and has been chair of the Program Committee for the Pulmonary Circulation Assembly (1991) and the Respiratory Cell Molecular Biology Assembly (1998).

Pitt was appointed as the Professor and Chairman, Department of Environmental and Occupational Health, University of Pittsburgh Graduate School of Public Health in 2000. He is also Professor of Pharmacology and Bioengineering in the School of

Bruce Pitt

Medicine and Engineering, respectively. Previous to his appointment, he was Professor and Vice-chairman of Pharmacology at the University of Pittsburgh School Medicine (1987-present) and on the faculty at Yale University School of Medicine (1981-1987). Pitt completed his undergraduate degree at Brown University in Providence, RI and received his PhD in environmental physiology from The Johns Hopkins University School of Public Health (1976). Pitt's research focuses on the molecular pharmacology of the pulmonary vasculature, including the effects of nitric oxide on pulmonary endothelial and vascular smooth muscle cell function and the role of pulmonary endothelium in acute and chronic lung disease. Current efforts are directed towards studies on zinc homeostasis in vascular endothelium including: roles of the metal binding protein, metallothionein, in sensitivity to acute lung injury and vascular dysfunction in hemorrhagic shock; and S-nitrosation of zinc-sulfur clusters in NO signaling. Experimental murine models including the use of contemporary imaging approaches and non-viral mediated endothelial cell directed somatic gene transfer are used to test these hypotheses. This work has been supported in part by an Established Investigatorship from the American Heart Association and a MERIT award from the NIH Heart Lung Blood Institute.

Pitt notes that as a result of highly productive interactions between our two major groups, e.g., Regulation of Respiration and the rest of us (lung cell biology and physiology), a vital role for the Respiration Section is apparent in FASEB, APS and the Experimental Biology meeting. The concept of "a small meeting within a large meeting," the opportunity to participate in state of the art extrapulmonary science, the active platform for graduate and postdoctoral students, the close interactions between neuronal and non-neuronal respiratory

scientists and the access to advanced technologies via seminars and exhibits have assured our expanding effort in spite of strong competition via the American Thoracic Society. Accordingly, the Respiration Section has an extraordinary opportunity to take advantage of the momentum that was so well established by the former chairman, **Michael Matthay**, and a number of highly dedicated colleagues including **Usha Raj, Jahar Bhattacharya, Jerry Dempsey and Robb Glenny.** This section's recent accomplishments as well as future goals are include the following.

The most critical need for our section is recruitment and expanded involvement of young respiratory scientists. To achieve this goal, we have: a) initiated the Julius Comroe Jr. Travel Award to four young investigators who submitted abstracts to the Respiration Section; b) continued scientific management of the generous and significant Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine to assist two junior investigators in their transition to faculty positions; c) reduced ticket prices for fellows and students to the annual dinner; and d) established an unopposed evening poster symposium for postgraduate and graduate student. Current efforts are underway to: a) establish mechanisms to increase the number of travel awards via private donations to the Respiration Section; b) identify positions within FASEB so that junior investigators can be involved in our governance and scientific endeavors; and c) increase opportunities in oral presentations and symposia for junior investigators. It is noteworthy that APS has just approved complimentary advanced registration to add to the value of young investigator awards.

The annual Experimental Biology meeting and programming for members of the Respiration Section remains our highest priority. In this regard, we continue to assure equal representation of important symposia for our two major groups, attempt to cross list symposia with other sections and participate in workshops and other specialized platforms (featured topics, minisymposium). Because of the importance of this endeavor and in recognition of the significant extra programming work in preparation for the next international physiological meeting, we have: a) elected for the first time, two program co-representatives (**Ralph Fregosi and Troy Stevens**); and b) recruited **Usha Raj** as our representative on the international programming committee. Coordinated social and scientific activities remain vital to the meeting and it is delightful to acknowledge the long-standing success of the Respiration Dinner (thanks to **Robb Glenny** for organizing it and **Wiltz Wagner** for providing the entertainment) and the 35th Non Annual Control of Respiration Mixer (organized by **Jerry Bisgard** and **Jerrry Dempsey),** as well as continued success of the recently introduced evening Postgraduate-Young Investigator Poster session.

Exchange of information is a major benefit of association with the Respiration Section. In this regard, **Robb Glenny** has edited a vital source of such information via the Respiration Section newsletter that can be accessed readily via the APS website (http://www.the-aps.org).

Representation by the Respiration Section in important endeavors in pulmonary research and education remains a high priority. In this regard, we have: a) participated in beginning of coordinated approaches for medical physiology education with colleagues in the American Thoracic Society; b) been involved in suggesting representatives to the NIH Center for Scientific Review to serve on a panel to reorganize study sections that review pulmonary science; and c) serve as an administrative base for *J. Appl. Physiol* and *Am. J. Physiol: Lung Cell Mol. Physiol.*

Pitt and the newly elected officers in the Respiration Section, including **Gary Sieck,** Chair-elect; **Kurt Albertine,** Treasurer; **Robb Glenny,** secretary; and **Troy Stevens** and **Ralph Fregosi,** Program Committee, urge members to contact officers (listed in the Winter 2002 Newsletter via the APS website) with interest in serving on committees, suggestions for programming and/or other concerns. ❖

Introducing Matthew Grisham

Matthew B. Grisham was elected Chair of the Gastrointestinal/Liver Section and assumed duties in April 2002, succeeding **Helen Raybould.** Grisham has previously served the Gastrointestinal/Liver Section as Chair of the Programming Committee and as the Section's representative on the Joint Programming Committee for the APS from 1999-2002. He has also served on the editorial board of the *American Journal of Physiology-Gastrointestinal/Liver* Section. In addition to his involvement in the APS, Grisham is currently President of the Oxygen Society and serves as an associate editor for its journal *Free Radical Biology and Medicine*. He has also served on the editorial boards of *Inflammatory Bowel Disease* and the *Journal of Immunology*. Grisham remains actively involved in the American Gastroenterological Association (AGA) where he recently completed his three-year tenure on their Publications Committee and continues to serve as a member of the Immunology, Microbiology and Inflammatory Bowel Disease (IMIBD) Section of the AGA.

Grisham is currently professor in the Department of Molecular and Cellular Physiology and Associate Director of the Arthritis Center of Excellence at LSU Health Sciences Center in Shreveport, LA. Grisham received his PhD degree in Biochemistry from Texas Tech University Health Sciences Center in 1982 and obtained his postdoctoral training at St. Jude Children's Research Hospital from 1982-84. In 1984 Grisham moved to the Department of Biochemistry at the University of South Alabama College of Medicine where he assumed the position of assistant professor until his move to LSU Health Sciences Center in 1987. Grisham's research focuses on the immunology and pathophysiology of chronic gut inflammation. Chronic inflammatory disorders such as the inflammatory bowel diseases are characterized by the sustained overproduction of reactive oxygen and nitrogen species, up-regulation of pro-inflammatory cytokines,

Matthew B. Grisham

infiltration of large numbers of leukocytes into the interstitium and tissue injury and dysfunction. Grisham's laboratory is investigating the mechanisms by which reactive metabolites of oxygen (e.g. superoxide, hydrogen peroxide) and nitrogen (e.g. nitric oxide) modulate transcriptional activation of different genes (e.g., cytokines, antioxidants, adhesion molecules) thought to play important roles in regulating inflammatory tissue injury. In addition, Grisham maintains an active interest in the pathophysiological mechanisms responsible for post-ischemic liver injury. These areas of research have necessitated the utilization of molecular, immunological and physiological approaches.

As the newly elected chair of the Gastrointestinal/Liver Section, Grisham has identified two major areas of section interest that will receive increased attention over the next three years. First and foremost is to improve the quality of programming for the Section for the Experimental Biology meeting. For the past few years, the Gastrointestinal/Liver Section has had to compete with the AGA for submission of abstracts as meeting times for EB and the AGA are approximately one month apart. This situation has resulted in a decline in EB attendance of investigators who actively work in the fields of gastrointestial/liver physiology and pathophysiology. In order to reverse this trend, Grisham and the programming committee plan to actively recruit the participation of the leaders in the gastrointestinal and hepatology fields in state-of-the-art symposia and featured topics for upcoming EB meetings. In keeping with the emphasis of the APS on translational research, Grisham will also encourage more programming with the "bench to bedside" concept. Indeed, Grisham has taken advantage of his involvement in the AGA and Oxygen Society to actively promote the APS and the concept that gastrointestinal/liver physiology represents the foundation for translational research in the gastroenterology and hepatology.

Another major area of emphasis for the section will be to continue to encourage the participation of students and young investigators as well as women in the Gastrointestinal/Liver Section. Under the leadership of the past chair **Helen Raybould,** the section made remarkable strides in promoting the participation of young people and women in the section. This type of commitment will be expanded over the next three years with the help of the energetic investigators who sit on the committee. **Helen Raybould** will remain as Past Chair with **Hugh Nellens** acting as both the section Secretary/Treasurer and as the section representative to the Liaison with Industry Committee. Both Raybould and Nellens deserve special thanks for their leadership and innovative ideas on programming over the past three years. Councillors **Linda Samuelson** and **Nigel Bunnett** will also be involved in planning upcoming section functions and reporting to the APS. **Mrinalini Rao** is currently the section representative on Committee on Committees and been invaluable in society and section integration. The section is particularly fortunate to have **Chris Cheeseman** assume the position of Chair of the section's Programming Committee and section representative to the Joint Program Committee. He is currently finalizing the section program for EB 2003. Last but not least, the Gastrointestinal/Liver section is happy to welcome new Councilors **Ron Ferraris** and **Curtis Okamoto.** ❖

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Second Meeting of the Gulf Coast Physiological Society

The Gulf Coast Physiological Society held its second meeting at the University of Mississippi Medical Center on March 1 and 2, 2002. The meeting was co-sponsored by the Center for Excellence in Cardiovascular-Renal Research at the University of Mississippi Medical Center. The event was attended by nearly 140 investigators and interested undergraduate students from the University of Mississippi Medical Center, Louisiana State University (LSU), Shreveport, LSU—New Orleans, Tulane University, University of South Alabama, Tougaloo College, Jackson State University and Seminary College. **Joey Granger**, President of the Gulf Coast Physiological Society, organized the meeting. The organizing committee also included **Robert Hester**, **Raouf Khalil**, and **Jane Reckelhoff**.

The meeting began with welcoming remarks from Dan Jones, Associate Vice Chancellor of the University of Mississippi Medical Center. The first session began with the Gertrude and Florian Nelson Cardiovascular Research Lecture. **Sanjiv Ghambir** of UCLA School of Medicine presented an exciting lecture on "Multimodality Molecular Imaging with Applications in Biology and Medicine." The American Physiological Society, the American Heart Association, and the Center for Excellence in Cardiovascular-Renal Research sponsored the lecture.

Ghambir's lecture was followed by a two-hour poster session. The session included 60 poster presentations by faculty, postdoctoral fellows, graduate students, and undergraduate students. The meeting consisted of four major sessions that included 30-minute state-of-the-art presentations from faculty representing all major institutions of the GCPS. Following the lectures were 10-minute presentations from junior faculty, postdoctoral fellows, and graduate and undergraduate students.

The meeting also included a presentation by the President of the APS, **John Hall**. Hall discussed new and exciting initiatives at the APS.

One of the highlights of the meeting was the GCPS banquet that was held at the elegant Fairview Inn in Jackson. The banquet was held in honor of **Aubrey Taylor**, University of South Alabama and **John Spitzer**, LSU—New Orleans. Both Taylor and Spitzer served as Chairmen of their respective physiology departments for over 25 years. Harvey Miller of LSU, New Orleans, summarized Spitzer's accomplishments. **Neil Granger** presented Taylor's achievements to the GCPS group. The evening concluded with **Martin Frank** presenting Spitzer and Taylor with a plaque from the APS in recognition of their contributions to the APS and the discipline of physiology.

The meeting concluded on Saturday, March 2, with a brief business meeting. New officers were elected and included **Mary Townsley** as President and **James Parker** as Secretary and Treasurer. Both Townsley and Parker are from the University of South Alabama. The new Councillors of the GCPS include **Heather Drummond**, University of Mississippi Medical Center; **Lisa Harrison-Bernard**, Tulane University; **Patricia Molina**, LSU–New Orleans; and **Matt Grisham**, LSU—Shreveport. It was decided that the next meeting will be held in 2003 in Mobile, AL. The new GCPS President, Mary Townsley, will be chairing the organizing committee for the meeting. ❖

Joey Granger, Gulf Coast Physiological Society President

APS Executive Director Martin Frank presents John Spitzer and Aubrey Taylor with a plaque from the APS in recognition of their contributions to the APS and the discipline of physiology.

APS Executive Director Martin Frank; GCPS President Joey Granger, UCLA and GCPS Meeting Lecturer Sanjiv Ghambir; Associate Vice Chancellor of the University of Mississippi Medical Center Daniel Jones, APS President John Hall.

Nebraska Physiological Society Holds Fifth Annual Meeting

The fifth annual meeting of the Nebraska Physiological Society (NPS) was held on Monday, May 20, in the Skutt Student Center on the Campus of Creighton University in Omaha, NE. This meeting was the first joint meeting between the Nebraska and Iowa Physiological Societies (IPS). The total number of participants at the meeting was 104, which included 79 members from the NPS and approximately 25 members from the IPS. In addition, 44 research posters were presented. A new feature to the meeting this year was the selection of four graduate student research projects for PowerPoint presentations to the group, with an award to the student whose work was judged to be superior. A panel of judges comprised of members of both state societies selected these four student projects from the abstracts submitted. These four students were notified of their selection prior to the meeting and prepared a 10-minute PowerPoint presentation summarizing their work. While all of the student presentations were excellent, the $250 award was presented to **Jennifer M. Green** of the Department of Physiology and Biophysics at the University of Nebraska Medical Center (UNMC) for her work entitled, "Potassium channel characterization of cerebral vascular smooth muscle from diabetic rats." Other students selected to give PowerPoint presentations were **Yu Wang**, Department of Physiology and Biophysics, UNMC, for her work entitled "AT1-receptor mRNA antisense normalizes enhanced cardiac sympathetic afferent reflex in rats with heart failure;" **Alecia S. Hollman**, Department of Pediatrics and Nephrology, UNMC, for her work entitled "Diabetic renal hypertrophy in estrogen receptor alpha null mice;" and **Qi Che**, Department of Physiology and Biophysics, UNMC, for her work entitled "Afferent arteriolar [Ca2+]i responses to angiotensin II involve EGF receptor tyrosine kinase-dependent Ca2+ influx."

The meeting began at 10:45 am with welcome and introductory remarks from **David H. Petzel,** President of NPS and Professor of Biomedical Sciences, Creighton University. Next, **Martin Frank**, Executive Director of the American Physiological Society (APS), gave a brief update on the status of the APS and its future goals. One project Frank mentioned specifically is the work being done to get all past volumes of the APS journals, dating back to 1898, online in the next two to three years. The morning's keynote address was presented by the NPS guest lecturer, **William H. Dantzler**, Past President of the APS and current Professor and Chairman of the Department of Physiology at the University of Arizona College of Medicine. The title of Dantzler's talk was "New Wine in Old Bottles? or Old Wine in New Bottles? Insights into Function and Structure of Inner Medullary Thin Limbs of Henle's Loop." His talk highlighted new information concerning the anatomy and physiology of the nephron loops of juxtamedullary nephrons.

Following the morning keynote address, meeting participants had two hours to view the posters and enjoy lunch. Departments and institutions represented in the poster session included the Departments of Physiology and Biophysics, Pharmacology, OB/GYN, Eppley Cancer Center, and Ophthalmology at UNMC; the Departments of Pharmacology and Biomedical Sciences at Creighton University; the Department of Animal Science at the University of Nebraska, Lincoln; the Department of Biology at the University of Nebraska, Kearney; the Departments of Internal Medicine, Anatomy and Cell Biology, and Physiology and Biophysics at the University of Iowa College of Medicine; The Veterans Affairs Medical Center (Iowa City); Department of Surgery Education and Trauma, Iowa Methodist Medical Center (Des Moines); College of Pharmacy at Drake University; Department of Medical Microbiology and Immunology at Southern Illinois University College of Medicine; Department of Pharmacology at Emory University; and the Department of Zoology and Neurobiology at the University of Pecs (Hungary). Research topics included ion channels, growth factors, receptor sensitivities, kinases, baroreflex function, nitric oxide synthesis, renal sympathetic function, and hemorrhage and resuscitation. The interactions between investigators from different physiological specialties and from different institutions were excellent. During this time period participants were also able to view the exhibit set up by Biorad Laboratories.

Following the poster session, meeting participants gathered for the afternoon keynote address, presented by the IPS guest lecturer, **Francisco Mora**, who was introduced by **Ronald J. Torry**, IPS President and Professor in the College of Pharmacy at Drake University. Mora is a Professor of Human Physiology and Chairman of the Department of Physiology in the Faculty of Medicine at the University of Complutense of Madrid. In addition, he is an Adjunct Professor in the Department of Physiology and Biophysics at the University of Iowa School of Medicine. The title of Mora's talk was "The Enigma of the Aging Brain: Old Dogmas and New Perspectives," in which he highlighted recent work into demonstrating that the death of brain cells is not a part of "normal" aging and that new brain cells are indeed generated as an individual ages.

The four student presentations followed Mora's talk. While the judges met to decide the winner of the student awards, Dantzler spoke briefly about issues facing the APS and the American Association of Medical Colleges (AAMC). Dantzler reported that the AAMC is giving more and more attention to the basic sciences, and a meeting scheduled for October in Philadelphia will focus on the "evolving role of basic science chairs." It is hoped that chairs attending this meeting will learn valuable information about budget and funding issues, rank and tenure decisions, and medical school curricula. This meeting is

specifically designed for chairs of basic science departments at medical colleges, and the plan is to hold such a meeting every other year. One goal of these meetings is also to increase awareness in the AAMC and accreditation committees of issues facing basic sciences. At the conclusion of Dantzler's talk, Green was presented with her award, and the two societies separated so that each could conduct its annual business meeting.

Petzel opened the NPS business meeting by asking for approval of the minutes from last year's annual meeting. **Janet E. Steele**, Secretary-Treasurer, presented the current financial status of the NPS. While the current economic situation has limited contributions from sponsors for support of the annual meeting, the NPS is still in good financial shape. While expenses for this year's meeting were expected to exceed revenue by approximately 12.5%, the organization still has a budget surplus. Steele thanked this year's sponsors, including the Department of Biomedical Sciences at Creighton University; the Department of Physiology and Biophysics at UNMC; the McGraw-Hill Publishing Company; and Bio-Rad Laboratories. Steele then updated the members about the status of the Local Outreach Team (LOT) she had started last year. The LOT is a program sponsored by the APS to improve physiology teaching in middle and high schools. Steele reported that she has a team organized, but the APS was unable to sponsor LOT last year. Steele distributed information outlining the current request for proposals from APS for the LOT program, and encouraged anyone interested in helping with this important program to contact her. **Irving Zucker** next proposed an increase in the dues structure by $5 for all members. It was pointed out that this would be a much larger increase, on a percentage basis, for the students (from $5 to $10) than for the faculty (from $20 to $25). While many faculty said they paid the dues for their students, it was decided that any change in dues structure should be voted on by the entire membership.

Zucker then proposed that the position of Executive Director of NPS be created and filled by **Cindy Norton.** While this was accepted by the membership present, it would require a change in the bylaws and must also be voted on by the entire membership. Petzel presented Norton with a small gift for all of her assistance to the NPS. An election was to be held for president-elect and councillor, but, with the relatively small number of members remaining for the business meeting, it was decided that this, too, should be put to the entire membership for a vote. Petzel presented Past-President **Pamela K. Carmines** with a plaque commemorating her work for the NPS, and then he introduced NPS President-Elect **Shyamal K. Roy**.

Following their individual business meetings, the NPS and IPS officers held a brief joint business meeting to discuss the possibility and feasibility of future joint meetings. Possible dates and locations were discussed, and it was decided that more information about meeting site availability and costs were needed before a decision could be made. ❖

Cindy Norton

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Twenty Teachers Attend APS Professional Development Workshop

During the week of July 22-28, 20 Summer Research Teachers (SRTs) from this year's "Frontiers in Physiology" and "Explorations in Biomedicine" Fellowship programs gathered at the Airlie Center in Warrenton, VA. In this intensive workshop, the teachers explored inquiry- and equity-based teaching strategies, how to integrate technology into their classroom and the use of animals in teaching and research. The SRTs participated in numerous hands-on laboratory and web-based activities, shared their summer research experiences, evaluated their current teaching techniques, and collaboratively developed strategies to implement teaching methods promoted by the National Science Education Standards. The SRTs also started developing their own hands-on, inquiry-based science activities. The teachers left the Airlie Center exhausted but thrilled with all that they had learned and the vibrant collegial network that had formed over the week.

The 2002 SRTs spent the majority of the summer conducting research in APS-member host laboratories, learning first-hand how the research process works. Over the last twelve years, the APS has partnered with many of the nation's leading biomedical academic, private, and government research facilities to provide research opportunities for over 270 teachers.

The "Frontiers in Physiology" and "Explorations in Biomedicine" Professional Development Fellowships seek to build on-going connections between science instructors and the biomedical research community. The summertime workshop and research experience are components of the competitive year-long Fellowships.

SRTs will also attend the Experimental Biology (EB) 2003 meeting in San Diego, CA, to further their science experiences and learn about the latest life-science research findings. Many SRTs will present their own research findings and/or activities at EB poster sessions.

The "Frontiers" Fellowship awardees teach at middle and high schools across the US. "Frontiers in Physiology" is a program of APS, and is sponsored by APS, the National Center for Research Resources (NCRR) Science Education Partnership Awards (SEPA), and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) at the National Institutes of Health.

The "Explorations in Biomedicine" Fellowship is sponsored by APS and the National Institute of General Medical Sciences (NIGMS)/Minority Access to Research Careers (MARC) Program. "Explorations" SRTs teach primarily Native American students at middle and high schools, and tribal colleges on Montana reservations.

Mentors and Curriculum Development: Deepening the Learning

Another vital component of the weeklong Professional Development Workshop is the guidance provided by the Mentor/Instructor team composed of former SRTs and Physiologists-in-Residence. In 2001, the Frontiers and Explorations programs expanded to include Curriculum Development Summer Research Teacher (CD-SRT) Fellowships. These fellowships are designated for selected past SRTs, and offer teachers the opportunity to further develop their mentoring, educational technology, and curriculum development skills.

This year, two teams of CD-SRTs are developing web-based science activities in collaboration with Project WISE, of the University of California-Berkeley. Project WISE (Web-based Inquiry Science Environment) is an online science learning environment for students in grades 4-12, supported by the National Science Foundation. The CD-SRT team of **Charlie Geach**, of El Paso ISD Technology, El Paso, TX, and **Lisa Bidelspach**, of Clear Creek High School, League City, TX is adding finishing touches to their unit on the sense of touch and mechanoreceptors. **Mary Alice Thomas** of Polson High School, Polson, MT and **Bob Madsen** of Chief Dull Knife College, Lame Deer, MT have teamed

Traveling from points as diverse as New Mexico, North Dakota and Florida, the twenty 2002 Summer Research Teachers gathered in Virginia for an intensive week long workshop.

Workshops included hands-on physiology lab activities from APS' Physiology of Fitness unit. This team is discussing possible experimental designs for the "Elvis experiments."

up to create a unit on membrane permeability. Their completed units will involve students in web-based activities and discussions, hands-on lab experiments, and research questions linked to internet resources.

Two other former SRTs, **Isabelle Camille**, of Coral Gables High School, Miami, FL and **Margaret Shain**, of Our Lady of Perpetual Help Jr. High School, New Albany, IN, also served as mentors and instructors during the workshop. Isabelle, Margaret, Charlie, Lisa, Bob and Mary Alice will mentor the 2002 SRTs throughout the Fellowship year, mostly via email.

APS Members Serve as Physiologists-in-Residence

Jeff Falcone, University of Louisville, Louisville, KY and **Martin Farias**, University of North Texas Health Science Center, Forth Worth, TX served as Physiologists-in-Residence during the 2002 Professional Development Workshop. Both actively and effectively fielded the SRTs' numerous questions related to science content, the use of animals in research, and classroom equity issues. Falcone and Farias also provided assistance to teachers as they began developing science labs and activities to use in their classrooms.

Back by popular demand, **Susan Glueck**, Brigham & Women's Hospital, and deputy editor of the APS journal, *Physiological Genomics*, presented a lively discussion on genomics. Glueck presented information on the Human Genome Project and current genomics research findings in government and private sectors. She also fielded numerous questions about the genomics field, and presented participants with a "hot-list" of related Internet resources.

Applications for the 2003 Professional Development Fellowships are available on the APS website at http://www.the-aps.org/education/edu_k12.htm. For additional information about the summer research programs, email the APS Education Office at education@the-aps.org, or call 301-634-7132. ❖

2002-2003 Porter Physiology Fellows Announced

The APS and Porter Physiology Development Committee congratulate the 2002-2003 APS Porter Physiology Fellows:
Rashad Jabali Belin, Univ. of Illinois, Chicago
Wendy Brisbon, Meharry Medical College
Jorge L. Gonzalez-Perez, Univ. of Puerto Rico, Medical Sciences Campus
Becky Marquez, Cornell Univ.
Carmen Aracelis Padró, Univ. of Puerto Rico Medical Science Campus
Myla Patterson, Meharry Medical College
Maurice Williams, University of North Texas Health Science Center
Elethia A. Woolfolk, Meharry Medical College

The Porter Physiology Fellowships for minorities are 1-year fellowships that provide a stipend of $18,000. The fellowships are open to underrepresented ethnic minority applicants (African Americans, Hispanics, Native Americans, Native Alaskans, or Pacific Islanders) who are citizens or permanent residents of the United States or its territories. Applicants must have been accepted into or currently be enrolled in a graduate program pursuing an advanced degree in the physiological sciences. For more information, see the APS website at http://www.the-aps.org/education/minority_prog/porterfell.htm or contact Melinda Lowy in the APS Education Office at education@the-aps.org or 301-634-7132. ❖

Gift Planning Opportunities

The American Physiological Society is pleased to invite the membership to consider including the APS in their gift giving plans. Over the last several years, the Society has received donations of land and securities, all of which have been used to launch the Society's various young investigator award programs.

Many options exist if you are interested in including the APS and its Endowment Fund in your financial or estate planning. Some options include:

Immediate Gifts: Cash, gifts of appreciated securities, gifts of closely held stock, gifts of tangible personal property, retirement assets, charitable lead trusts and gifts of real estate.

Life Income Gifts: Gift annuities, deferred payment gift annuities, charitable remainder trusts, charitable remainder unitrusts, and charitable annuity trusts.

Gifts of Insurance: Ownership of life insurance policies can be donated, or the APS can become the beneficiary of policies owned by others.

Designated Gifts: Gifts given to honor or memorialize an individual or an organization and can include scholarships, programs, etc., which are specified for support and named for individuals.

Gifts by Will: Bequests of a percentage of estate, stated dollar amount or specific property or assets.

For more information on gift giving to the APS, please contact Martin Frank, Executive Director (Tel.: 301-530-7118, Email: mfrank@the-aps.org), or Robert Price, Director of Finance (Tel.: 301-530-7160, Email: rprice@the-aps.org).

New Regular Members

*transferred from Student Membership

Larry F. Abbott
Brandeis Univ., MA
William S. Agnew
Johns Hopkins Univ., MD
John Grover Bailey
Mississippi State Univ.
Timothy W. Bailey*
Oregon Health Sciences Univ.
John-Paul Baird
Amherst College, MA
Angelique Bordey
Yale Univ. School of Medicine, CT
Patricia Chakur Brum
Univ. of Sao Paulo, Brazil
Todd C. Carpenter
Univ. of Colorado Health Sci. Ctr.
Christopher C. Cheatham
John B. Pierce Lab, CT
Hwee-Ming Cheng
Univ. of Malaya, Malaysia
Yildirim Cinar
Univ. of Abant Zzet Baysal, Turkey
Simon J. Conway
Medical College of Georgia
Manuel L. Covarrubias
Thomas Jefferson Univ., PA
Pierre C. Dagher
Indiana Univ.
Kam D. Dahlquist
Gladstone Inst. of Cardiovasc. Disease, Univ. CA, San Francisco
Bruce M. Damon*
Vanderbilt Univ. Medical Ctr., TN
Kornel Danos
Semmelweis Univ., Hungary
Opher Donchin
Johns Hopkins Univ., MD
Maria Florez-Duquet*
California State Polytechnic Univ.
Robert G. Foehring
Univ. of Tennessee
Sherif E. Gabriel
Univ. of North Carolina, Chapel Hill
Michael S. Glasgow
Anne Arundel Community Coll., MD
David Jonathan Glass
Regeneron Pharmaceuticals, NY
Brian E. Hunt*
Hebrew Rehab. Ctr for Aged, MA
Boye L. Jensen
Univ. of Southern Denmark
Peter Lloyd Jones
Univ. of Colorado Health Sci. Ctr.
Jonathan D. Kibble
St. George's Univ., West Indies
Krzysztof Kowalski
Case Western Reserve Univ., OH
Lymperis 'Perry' Koziris*
Univ. of North Texas
Noga Kronfeld-Schor
Tel Aviv Univ., Israel
Anne Emilie Kwitek
Medical College of Wisconsin
Yan Chun Li
Univ. of Chicago, IL
Jim Jung-Ching Lin
Univ. of Iowa
Massoud Mahmoudian
Iran Univ. of Med. Sci., Iran
Melinda Millard-Stafford
Georgia Institute of Technology
Kevin D. Monahan*
Univ. of Colorado
Adriana Monroy
Univ. Nacional Autonoma De Mexico, Mexico
Iran Hiram Muir
Nike, Inc., Beaverton, OR
Michael J. Mustari
Emory University, GA
Gaabi Nindl
Indiana Univ. School of Med.
Victoria Fay Norwood
Univ. of Virginia
Pablo Alfredo Ortiz
Henry Ford Health Sci. Ctr., MI
Dagogo John Pepple*
Univ. of West Indies, British West Indies
Dirk Pette
Univ. of Konstanz, Germany
Harmut Porzig
Univ. of Bern, Switzerland
Madhu Prasad
VA Med Ctr., Boston, MA
Kai Qiu
Univ. of Florida
Oliver Racz
Safarif Univ. Med. Sch., Iran
Bernardo Rodriguez-Iturbe
Hospital Univ., Venezuela
Ashok Kumar Saluja
Harvard University, MA
Raudel Sandoval*
Univ. of Illinois, Chicago
Eugene W. Shek
VA Med Ctr
Don Shult
Houston Comm. Coll. Syst., TX
Corigan T. Smothers*
Medical Univ. of South Carolina
XiaoMei Song
Washington Univ., MO
Dariusz Szukiewicz
Univ. School of Medicine, Poland
Masato Taira
Nihon Univ. School of Medicine, Japan
Karen Teff
Monell Chemical Senses Center, PA
Ian Van Tets
Univ. of Alaska, Anchorage
Paul D. Thompson
Hartford Hospital, CT
Yibin Wang
Univ. of Maryland, Baltimore
Peilin Wei
Univ. of Nebraska Medical Ctr.
Richard P. Wyeth
Radford Univ., VA
Shen-Ling Xia
Univ. of Florida
Asma Yaghi*
Univ. of Western Ontario, Canada
Li Yang*
Univ. of Southern California
Ben B. Yaspelkis*
California State Univ., Northridge
Yan-Ping Zhang
Univ. of Miami School of Med., FL
Xinsheng Zhu*
Univ. of Wisconsin, Madison

New Affiliate Member

Virginia del Pilar Ariza Neitd
Univ. of Minnesota

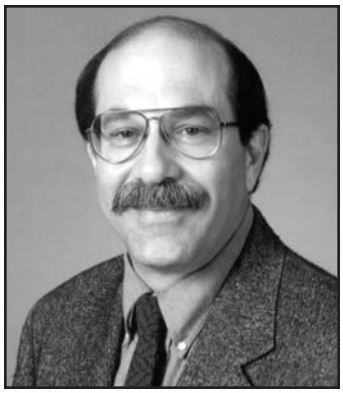
New Student Members

Stehos Anastassoppulos
Univ. of Athens, Greece
James R. Austgen
Univ. of Missouri, Columbia
Naomi Elisabeth Brooks
Ohio Univ.
Chun Mei Cao
Zhejiang Univ. Sch Med, China
Rosa Cardenas
Univ. of Peruana Cayetano Heredia, Peru
Vincent Wang-Wen Chiu
Univ. of Maryland
Melissa Renee Cook
Ball State Univ., IN
Joseph Antonio Covi
Louisiana State Univ.
Carla E. Cox
Univ. of Montana
Andrew R. Creer
Ball State Univ., IN
Ericka R. Daniels
Medical College of Georgia
Luis A. Del Carpio Bellide-Vargas
Univ. Nacioual De Trujillo, Peru
Bryan C. Fuchs
Saint Louis Univ., MO
Petra Golja
Institute Josef Stefan, Slovenia
Andrew Robert Judge
Univ. of Florida
Jason G. Langley
West Virginia Univ.
David E. Lankford
Univ. of Montana
Heather Jean Lee
Univ. of California, San Diego
Elizabeth Anne Lindsay
San Francisco State Univ., CA
Jennifer M. Lissade
Long Island Univ., NY
Sam Malik
Univ. of Calgary, Canada
Rhonda T. Malinao
San Francisco State Univ., CA
Joshua M.V. Mammen
Univ. of Cincinnati, OH
Haytham Mansour
Univ. of Illinois, Chicago
Christopher R. McCudden
Univ. of Western Ontario, Canada
Joe Tant McDonald
Univ. of Kansas School of Medicine
Marika Linn Mikhok
Univ. of Guelph, Canada
Diego F. Nino
Louisiana State Univ. Health Sci. Ctr.
Thomas Patrick Olson
Univ. of Minnesota
Ronald Ottersetter
Kent State Univ., OH
Silviu Valeriu Pasniciuc
Ohio State Univ.
B. Gail Pinto
Texas Christian Univ.
Lee Joseph Quinton
Louisiana State Univ.
William Richards
Ohio State Univ.
Desiree C. Robinson
Long Island Univ., NY
James G. Ryall
Univ. of Melbourne, Australia
Brian K. Schilling
Univ. of Memphis, TN
Mark D. Schuenke
Ohio Univ.
Keith A. Shannon
Virginia Commonwealth Univ.
Robynn M. Shannon
Virginia Commonwealth Univ.
Carwyn P. Sharp
Univ. of Texas Medical Branch
Ranjinder Sidhu
Univ. of Manitoba, Canada
Arnold Sipos
Semhelweis Univ., Hungary
Anita Smith
Medical College of Georgia
Ashley M. Stokes Holm
Louisiana State Univ. Sch Vet Med
Michael A. Tzoulis
Harokopeio Univ., Greece
Francisco C. Villafuerte
Univ. of Peruana Cayetano Heredia, Peru
Chadwick Lewis Wright
Ohio State Univ. College of Medicine
Maxim V. Zakhartsev
Univ. of Antwerp-RUCA, Belgium

Recently Deceased Members

William A. Calder
Tucson, AZ
Nancy A. Dahl
Lawrence, KS
Mary E. Dumm
State College, PA
J. Russell Elkinton
Bedford, MA
Peter L. Frommer
Rockville, MD
Harold G. Hempling
Charleston, SC
Peter W. Hochachka
Vancouver BC Canada
Robert E. Johnson
South Burlington, VT
Irving Kupfermann
New York, NY
Henry D. Lauson
Kiel, WI
Robert B. Livingston
San Rafael, CA
Donald M. MacCanon
Gaithersburg, MD
E.S. Mendelson
Philadelphia, PA
William D. Neff
Morris, IL
Richard K. Orkand
San Juan, PR
Harry D. Patton
Seattle, WA
Max F. Perutz
Cambridge UK
Tomas Alfred Reader
Montreal PQ Canada
Jonathan E. Rhoads
Philadelphia, PA
Milton H. Stetson
Newark, DE

Animal Care and Experimentation Committee



The Animal Care and Experimentation Committee (ACEC) is charged with overseeing all issues related to the procurement, use, and care of animals for research and teaching and advising the Council of actions to be taken or recommended. The ACEC again has been quite busy during the past year, not only dealing with ongoing concerns related to the use of animals in research and teaching, but also developing new programs that will contribute to the APS Strategic Plan. An important goal of the Strategic Plan is the development of a dynamic advocacy program to educate and inform the public, government, and other key audiences about the importance of physiology and the critical role of animal research.

The most important ongoing issues addressed by the Committee this past year were the proposed regulation of rats, mice, and birds by the USDA and the continuing public controversies related to the use of animals in research and teaching. When President Bush signed the farm aid bill into law on May 13, 2002, he also approved a provision that permanently excludes rats, mice, and birds from USDA oversight under the Animal Welfare Act (AWA). Senator Jesse Helms sponsored an amendment that was needed to resolve the question of whether the USDA should regulate rats, mice, and birds under the AWA. Animal activist organizations sought to block inclusion of the Helms language in the farm bill, but the research community prevailed. The National Association of Biomedical Research (NABR) provided leadership, and the APS helped mobilize other organizations. While the biomedical research community can claim victory after this long battle, it is clear that the animal rights community intends to continue the fight to interfere with biomedical research in the name of animal welfare. Therefore, APS and other research organizations must continue to develop proactive strategies to repel the efforts of animal rights activists; the development and implementation of such strategies is an ongoing ACEC project.

The ACEC is also developing a plan for a small group of APS members to receive training as public spokespersons on controversial issues related to the use of animals in research and teaching. Speaking out on the value of what we do is essential to retaining public support for the use of animals. The ACEC media training plan is part of the overall APS strategy to uphold the use of animals in research and biomedical science education. This year, both APS Councillor **J.R. Haywood** and ACEC Chairman **John N. Stallone** participated in public radio debates on the use of animals in research and teaching. Our successes in this arena underscore the importance of APS members publicly speaking out in support of animal use in teaching and research. The ACEC training plan will enhance APS effectiveness in the public arena.

Another successful function organized by ACEC this year was the Public Affairs Symposium held at EB 2002 in New Orleans, LA. This was a four hour IACUC training program open to all EB attendees, entitled "Everything You Ever Wanted to Know About the IACUC but Were Afraid to Ask." The APS organized the program, which was underwritten by the NIH Office of Laboratory Animal Welfare (OLAW) with additional support provided by ASPET, AAI, ASNS, AAA, and FASEB. The goal of this course was to provide scientists with focused training to improve their performance on and interaction with IACUCs. The symposium was modeled after the "IACUC 101" program developed by a group of IACUC administrators, and included presentations by APS Councillor **J.R. Haywood** and ACEC Chairman **John N. Stallone**. Comments received from ACEC members, representatives from AAALAC, USDA, and NIH/OLAW, and the audience uniformly described the symposium as highly successful in elucidating the operation of the IACUC as well as the expectations of the regulatory agencies. Due to success of this initial effort, a similar program will be held next year at EB 2003 in San Diego, CA.

In the coming year, the ACEC will continue to work on ongoing concerns related to the use of animals in research and teaching. The committee will also work on new projects including developing IACUC guidelines to assess pain and distress in animal models of exercise physiology, and developing a new program to provide increased research laboratory experiences for medical and veterinary students.

The committee strongly urges APS members to become involved individually by expressing their support for the use of animals in research and teaching, as well as their opposition to excessive regulatory burden, to their state and national government leaders. The use of the new APS "Legislative Action Center" in the Public Affairs pages of the APS website will greatly facilitate this process by enabling APS members to generate letters to their Senators and Representatives using the "Legislative Hot Zone" feature. ❖

John N. Stallone, Chair

Council accepted the report of the Animal Care and Experimentation Committee.

Council requested a more structured proposal including costs for selected APS members to receive media training on animal issues.

Council approved a $5,000 contribution to ILAR study on the need for laboratory animal veterinarians.

Council approved a one-time $1000 donation to the ILAR study.

Council approved having a trainee member on the Committee to be identified by the Committee on

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Awards Committee

The majority of the Awards Committee's efforts this year have been in reviewing applications for six different awards: the APS Postdoctoral Fellowship in Physiological Genomics, the Research Career Enhancement Award, the Teaching Career Enhancement Award, the Authur C. Guyton Award for Excellence in Integrative Physiology, the Shih-Chun Wang Young Investigator Award, and the Lazaro J. Mandel Young Investigator Award.

Based on discussions last year, we changed the application review process so that all reviews are conducted in more of an NIH study section format. Depending on the number of applications for each award, applications were reviewed initially either by the whole committee or by three assigned individuals. During the conference, applications were discussed one-by-one. After the discussion, all present Committee members rescored the application. After the conference call, Committee members submitted their new scores to the National Office, where they were tabulated, and the recommended recipients identified.

While we received a number of very high quality applications, the total number of applications submitted this year was less than last year.

2002 Awardees

Postdoctoral Fellowship Awards. We received 15 applications for the three Postdoctoral Fellowship Awards in Physiological Genomics. The Committee recommended that the awardees be **Brian R. Wamhoff**, University of Virginia, Charlottesville, VA; **Malcolm A. Lyons,** The Jackson Laboratory, Bar Harbor, ME; and **Ana Diez-Sampredo**, UCLA School of Medicine, Los Angeles, CA. Based on the new funding scale, these awards were funded at $32,000 for the first year and will be funded at $35,000 for the second year.

The Research Career Enhancement (RCEA) and Teaching Career Enhancement (TCEA) Awards. The RCEA and TCEA Awards are designed to enhance the career potential of regular APS members. The RCEA supports short-term visits to other laboratories in order to acquire new skills or attendance at a course directly related to a particular research methodology. The TCEA provides funds for the development of innovative and widely applicable programs for teaching physiology.

This year we received eight RCEA and one TCEA applications. We recommended funding of five RCEA awards to **Caryl Elizabeth Hill**, Yale University School of Medicine, New Haven, CT; **Paul Sown MacLean**, University of Colorado Health Sciences Center, Denver, CO; **Paul Joseph Fadel**, University of Texas Southwestern Medical Center, Dallas, TX; **Lius A. Martinez-Lemus,** Texas A&M University, College Station, TX; and **Kenneth Joseph Rodnick,** Idaho State University, Pocatello, ID.

Young Investigator Awards. The APS has three Young Investigator Awards: the Authur C. Guyton Award for Excellence in Integrative Physiology, the Shih-Chun Wang Young Investigator Award, and the Lazaro J. Mandel Young Investigator Award.

The Authur C. Guyton Award was established in 1993 and is awarded to an investigator who has demonstrated outstanding promise in research that utilizes quantitative and integrative approaches and feedback control system theory for the study of physiological function. The recipient cannot hold an academic rank higher than Assistant Professor. This year we received five applications for the award. The Committee recommended that the awardee be **Simon C. Malpas**, Auckland University Medical School, Auckland, New Zealand.

We received four applications for the Shih-Chun Wang Award. This award, established in 1998, is awarded to an investigator with an academic rank no higher than Assistant Professor, who has demonstrated outstanding promise in research in any area of the physiological sciences. This year's Committee recommendation is **Jeffrey T. Potts**, Wayne State University school of Medicine, Detroit, MI.

The Lazaro J. Mandel Award was established in 2000 in memory of Dr. Lazaro Mandel, Professor of Physiology at Duke University. The award is given to an individual demonstrating outstanding promise in epithelial or renal physiology, who holds an academic position no higher than Assistant Professor. We received six applications for the award this year, and recommend the awardee be **James D. Stockand**, University of Texas Health Sciences Center, San Antonio, TX.

Other Issues

The Committee met at EB 2002 in New Orleans. We reviewed our process for reviewing and recommending awardees for the Awards we handled. In addition, we discussed all of the objective and action items in the 2002 APS Strategic Plan that pertain to our Committee. As our past chair, **Tom Peterson,** recommended last year, APS established a task force to review the entire APS awards program. This task force had met by conference call a couple of times before the EB meeting. We discussed a number of the issues that the task force had brought up.

Our longest discussions were around the recommendations for broadening the focus of the postdoctoral fellowship awards and increasing the number of awards. The Committee felt unanimously that it was a good idea to broaden the scope of the fellowship awards, particularly to include translational research, and to increase the total number of fellowship awards. We also are in support of the current APS plan to increase the fellowship stipend to the point that it is about $5,000 more than an NIH NRSA award. We believe this will increase the prestige of the award.

Action Items

We requested that the APS Council consider two recom-

mendations.

1. Implementing a travel grant for senior postdoctoral students and junior faculty program that makes available funds for 20 $1,000 travel grants for basic and clinical science senior research postdocs and junior research faculty to attend focused research meetings directly related to their research program. We feel that such a program would permit junior researchers to update and/or broaden their expertise in newer areas of research or in the use of newer techniques, resulting in advancement of their research programs.

2. Implement a Grant-In-Aid program specifically targeted to a basic or clinical science researcher at a "smaller" institution who is collaborating with an established researcher at a "larger" institution. We feel that such a program would facilitate development of stronger researchers at "smaller" institutions, or institutions with limited resources. ❖

Pat Preisig, Chair

Council accepted the report of the Awards Committee.
Council supported a motion that the postdoctoral fellowship award stipend be no less than that of the NIH fellowships.

Career Opportunities in Physiology Committee

At the recent Experimental Biology meeting in New Orleans, the Career Opportunities in Physiology Committee sponsored a Careers Symposium entitled "Careers Opportunities in Physiology: Taking the Next Step." Four scientists from a variety of sectors—academia, the pharmaceutical industry, private philanthropic foundations, and medical journalism—spoke to an audience of about 150 pre-doctoral students and postdoctoral fellows. They gave an overview of their jobs and responsibilities and also spoke about the personal factors that led them towards these positions. There was much discussion about the major advantages and disadvantages of being a scientist in these various settings. Much of the session was dedicated to one-on-one and small group discussions between the panelists and members of the audience. The program was very well-received.

The APS Undergraduate Summer Research Fellow program is entering its third year. Last year's awardees attended the New Orleans EB meeting, with several presenting posters on their research from last summer. This year, we received another large number of excellent applications, and a new class of 12 awardees was granted research opportunities for this summer. Many of the fellows are leaning towards a career in research, and it is our hope that the research experience afforded them by this program will stimulate their interest and commitment to this path.

Our new APS Careers Brochure is scheduled to be available this summer. It is a handsome pamphlet that is informative for students between middle school and college, and for the general public. This year, the Committee is focusing on developing an outreach presentation package that APS members can use to speak to school groups and the general public about physiology. The package will consist of one or more PowerPoint presentation files that would incorporate a variety of illustrations and informational slides about career opportunities in physiology and the importance of physiological research. The concept is that these files would contain slides appropriate for different age groups, so that individual APS members could select the items relevant for the specific topic and audience they were addressing. The package will also contain slide templates so that each member can add his or her own illustrations and text to fit the specific group that will be addressed. It is hoped that these will be made available to APS members via the APS web site.

We are also planning to develop the APS Careers web site as a resource for students (from middle school right on through graduate school) and recent graduates from physiology programs who are seeking to learn more about educational programs and career opportunities in the physiological sciences. APS members are encouraged to keep an eye on this page as it develops and to recommend it to their students. ❖

Francis L. Belloni, Chair

Council accepted the report of the Career Opportunities in Physiology Committee.
Council approved the Careers in Physiology Symposium at EB 2003.
Council approved the continuation of the Summer Undergraduate Research Fellowship Program for 2002 and agreed to fund up to 12 fellowships in 2003.
Council approved funding to obtain the services of a graphic design specialist to develop an effective Careers web site.
Council approved the funding for a fall Committee meeting in Bethesda, MD.

Committee On Committees

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

The primary duty of the Committee on Committees is to nominate individuals to fill vacancies on the other APS standing committees. This year the committee recommended individuals to fill the following vacancies:

Animal Care Committee	3
Awards Committee	3
Career Opportunities in Physiology	2
Communications	2
Ray G. Daggs Award Committee	1
Education Committee	6
Finance Committee	1
International Physiology Committee	3
Long Range Planning Committee	3
Membership Committee	4
Perkins Memorial Fellowship	0
Porter Physiology Development	2
Public Affairs Committee	2
Publications Committee	1
Senior Physiologists Committee	2
Women in Physiology Committee	4

The committee also recommended individuals to fill vacancies on the FASEB Research Conference Advisory Committee, AAAS, and US National Committee on Biomechanics.

The APS members nominated to fill vacancies had the following sectional affiliation:

Cardiovascular Section	11
Cell & Molecular Physiology Section	9
Central Nervous System Section	2
Comparative Physiology Section	1
Endocrinology & Metabolism Section	5
Environmental & Exercise Physiology Section	4
Gastrointestinal Section	7
Neural Control & Autonomic Regulation Section	1
Renal Section	6
Respiration Section	2
Teaching of Physiology Section	1
Water & Electrolyte Homeostasis Section	2

There were 17 members less than 45 years of age nominated for committee vacancies and 22 women nominated.

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

The Committee on Committees briefly discussed the nomination process and procedures at its annual meeting held at EB 2002. The Committee agreed that the nomination process needed to be reviewed and updated. Council approved a one-day meeting of the Committee on Committees for this purpose. The meeting will be held on Monday, July 15, 2002. A list of recommended changes to the nomination process will be submitted to Council for review and approval at the fall Council meeting. ❖

Hannah V. Carey, Chair

Council accepted the report of the Committee on Committees.

Council approved the slate of nominees for committee vacancies with minor exceptions.

Communications Committee

June 2002 marked the end of the inaugural year for the APS Communications Office. The Communications Committee, comprised of six members, coordinates its efforts in conjunction with Donna Krupa, public relations consultant, and Stacy Brooks, APS communications specialist. An internal team of cross-departmental staff has also been formed to handle the day-to-day communications needs and to inform the Committee of pertinent issues. The Committee has established its main goal of providing the public with more information about physiology and the APS through public and media outreach. The Communications Office has initiated a number of programs with this goal in mind (detailed below).

Communications Symposium at EB 2003. The Communications Committee will have a Communications Symposium at EB 2003. It will take place from 2-4 PM on Friday, April 11. The first half of the symposium will feature a panel of three science journalists—one each from radio, television and print media—who will speak on what makes science news. The second part of the symposium will

be a hands-on primer by a medical publicist on how scientists can work with the media. This will include a mini-workshop where participants will engage in practical exercises.

Timeline of Physiology. The APS Timeline of Physiology was created as a general marketing tool for the media. The Communications Committee helped identify defining events and discoveries in the history of physiology. A revised version of the timeline was on display at EB 2002 along with suggestion cards to provide the membership with an opportunity to contribute. The Communications Committee is currently reviewing timeline suggestions received at EB.

Journal Release Program. The Communications Office publicizes the science published in APS journals through the "journal release program." Each month, abstracts are selected for promotion according to their newsworthiness. Once selected, these abstracts are summarized and compiled into releases that are sent out to science journalists and media outlets. These research publicity efforts, led by Donna Krupa, rely on the participation of APS journal editors and in-house editorial staff for suggestions about research of public interest.

Preliminary media tracking results indicate that reporters are interested in physiological findings. Media hits from the journals represent more than half of the total articles written about the APS.

Meetings and Conferences. The Communications Office also highlights research presented at APS-sponsored meetings and conferences. Donna Krupa works with the conference organizers to identify abstracts of media interest. Press releases are developed for selected abstracts and are then distributed to local and national media. For some of the smaller conferences, related journal article releases are distributed along with the conference releases to underscore the connection with APS.

APS Awards Program Publicity. Each year the APS provides fellowships to programs that benefit scientists, students (kindergarten through postdoctoral levels), teachers and the lay public. These programs have the potential to draw positive attention to APS. Since June, we have highlighted more than 10 APS programs geared to students, the educational community and the discipline of physiology.

Web Site Revisions. The APS Press Room has undergone numerous revisions. The goal of these changes was to create a user-friendly resource for the media through regular updates and organization of the contained information. This page has grown to contain the most updated information about APS programs and research along with a "Physiology in the News" section that links to recent news stories about physiology.

APS Experts Database. The Communications Committee is in the process of developing an APS Experts list that can be used as a resource when the media is searching for an expert in a particular topic in physiology. Currently, it consists of scientists who have answered reporter press queries directed to the Communications Office. The Committee is investigating ways to expand this database.

AAAS Mass Media Fellowship. The Communications Committee has assumed oversight responsibility for the AAAS Mass Media Fellowship from the Public Affairs Committee. This fellowship encourages an exchange between science and journalism. This year, we evaluated the applications and recommended funding for **Emily Singer**, who will spend 10 weeks in the newsroom of the *Los Angeles Times.* ❖

Andrea Gwosdow, Chair

Council accepted the report of the Communications Committee.

Council endorsed the idea of a media-training program and asked the Committee to submit a formal proposal for Council to review at the fall Council meeting.

Education Committee

The Education Committee supports a wide variety of projects and programs to promote physiology education at all educational levels. Current efforts are centered on recruiting materials to populate the APS Archive of Teaching Resources. This web-based searchable Archive houses materials to support instruction in the graduate, medical, undergraduate, and K-12 settings. This project is part of the BiosciEd Net (BEN) collaborative, a national digital library sponsored by the NSF. Interested faculty should visit the web site, http://www.apsarchive.org to access materials and to submit objects to the Archive. Also, members should be aware that the APS Teaching Career Enhancement Award can be used to develop and refine materials that may be submitted to the Archive.

The Medical Physiology Learning Objectives, a collaborative project by the APS and the Association of Chairs of Departments of Physiology (ACDP), was published and disseminated in late spring of 2002. Copies were sent to all ACDP members, and the publication is available free at the APS website. Departments may request up to 15 copies of the book for no charge; additional copies are available for $3 per copy.

At the undergraduate level, **Dee Silverthorn** is coordinating "Integrative Themes in Physiology" (ITIP), a NSF-funded program to enhance undergraduate physiology teaching. The program is developing and field-testing modules emphasizing common themes in physiology and determining how to effectively communicate them within an undergraduate course. The first module, "Gradients and

Conductance," has been field-tested and is being finalized for publication both in print and on the APS web site. This is a collaborative program between the Human Anatomy and Physiology Society (HAPS), the APS Teaching of Physiology Section, the APS Education Committee, the APS Education Office, and the APS journal *Advances in Physiology Education*.

APS also sponsors workshops, an exhibit, and a keynote research update speaker at the annual HAPS meeting. This year's speaker was **Barbara A. Horwitz**, APS President. In addition to her keynote talk, Horwitz convened a discussion group on how APS can work with undergraduate faculty to encourage student interest in physiology careers.

The APS has earned national recognition for the quality of the K-12 Science Education programs. This past year, programs included:

APS Summer Research Program for Teachers. The Summer Research Program continues to work with teachers from across the nation, engaging them in biomedical research and building connections at the local level between teachers, students, and researchers. This program is now in its 11th year, with continuation funding being received in Fall 2000 from three NIH institutes: NCRR (three years), NIGMS (five years), and NIDDK (five years). In these new grants, the APS will also be developing models to help teachers learn how to integrate web technology in their classrooms; therefore, many more innovative resources will be added to the APS web site. Member support for this program continues to be strong, with many members volunteering to host teachers in their laboratories and to provide the needed lab materials and supplies for their research. In February 2002, the Education Committee, along with several past Summer Research Teachers, selected 14 teachers to participate in the summer 2002 program. Most of the teachers' research hosts provided some in-kind support for their stipend and/or travel. For a listing of those teachers selected for the program, see the August 2002 issue of *The Physiologist* (http://www.the-aps.org/publications/journals/tphys/images/tphys8x02.pdf).

EB 2002 Workshop for Teachers and Students. This year's workshop was on physiological genomics, organized by **Jeff Osborne**, with **Susan Glueck**, deputy editor of *Physiological Genomics,* as the keynote speaker. More than 100 New Orleans high school teachers and students attended.

Local Outreach Team Workshops. With the continued funding mentioned above, additional funds are now available for APS members who want to hold workshops for middle and high school teachers in their local communities. The APS currently has 27 Local Outreach Teams (LOTs) (researchers and teachers working together to hold workshops). In addition, due to the enthusiastic work over the past two years, LOTs have developed six new workshop units on topics such as cell structure and function, physiology of exercise, renal physiology, gastrointestinal physiology, structure and function of the eye, and levers in the human body. These units are being field-tested and will be available in the coming year on the APS web site.

Explorations in Biomedicine. The APS' long-time collaboration with the American Indian Research Opportunities consortium (Montana State University and the Tribal Colleges of Montana) will continue for five more years, thanks to a continuation grant from the NIGMS. Explorations will continue to provide opportunities for Montana teachers to participate in the Summer Research Program and for undergraduate students to attend the Experimental Biology meetings. In May, **Rob Carroll**, **Joe Dan Coulter**, and **Subah Packer** participated in a retreat that brought together 25 Tribal College faculty and middle and high school teachers from reservations across Montana to learn about both best practices in teaching and the latest in physiology research, especially on issues of particular interest to Native Americans and on the use of Internet resources in teaching.

My Health, My World. The APS is continuing its successful collaboration with Baylor College of Medicine's elementary science and health education program.

APS Awards at the International Science and Engineering Fair. George Ordway coordinated the review and award to the best physiology projects at the 2002 International Science and Engineering Fair in May 2002. For more information on these awards and a listing of the award winners and their projects, see the August 2002 issue of *The Physiologist* (http://www.the-aps.org/publications/journals/tphys/images/tphys8x02.pdf).

Refresher Course at EB meeting. The "Neurophysiology Refresher Course" at EB 2002 was organized by **Cheryl Heesch** and **Tom Cunningham,** and included both molecular and integrative presentations. The morning session was followed by an afternoon workshop on problem-based learning. Both sessions received very positive ratings. For 2003, the theme will be skeletal, smooth and cardiac muscle, and the afternoon session will be a laboratory session on human exercise.

The success of the APS educational programs depends on the continuing involvement of the APS members. The Committee offers a sincere thanks to those physiologists who have contributed to the APS educational efforts over the past year and invites anyone interested in the education committee programs to contact Rob Carroll (carrollr@mail.ecu.edu) or Marsha Matyas (mmatyas@the-aps.org) for more information. ❖

Rob Carroll, Chair

Council accepted the report of the Education Committee.

Council approved the requested funds for the continuation of the summer research fellowship program.

Finance Committee

During the Spring meeting of Council, the Finance Committee Chair reported that the Society continues to be financially strong through sound management and investment practices. As directed by Council, the Society uses up to four percent of the value of its investments annually as operating income. Only that amount required to offset the cost of Society programs, other than the Journals Program, is withdrawn, and the remainder continues in actively managed investment accounts. The Journals Program, by a 1995 Council mandate, is expected to generate a return of 10% annually. These funds are also available to support the general operations of the Society.

Society Budget

The chair reviewed the 2001 budget versus actual income and expenses and presented the modified 2002 budget based on the 2001 results, as reviewed and approved by the Finance Committee at its Spring meeting. The Society employs a consolidated operating budget to manage overall operations. The consolidated budget is comprised of the individual budgets for the various cost centers; these include Publications, Membership and Meetings, Education, Public Affairs, Marketing, and the Executive, Information Technology, and Business Offices. For 2001, the year ended with income of $16,153,866 (including $1,279,672 allocated from the Society's investment income to supplement operations in accordance with Society policy) and direct expenses of $13,886,110, plus general and administrative (G&A) costs of $1,573,291, for total expenses of $15,459,401. G&A costs (the sum of Executive, Information Technology, and Business Office expenses) are allocated to other Society offices based on each office's share of total salary expenses. Including the $1,279,672 investment income allocation, total operating revenue exceeded total operating expenses, resulting in an increase in net assets from operations of $694,465.

The Council approved a 2002 budget of $16,280,746. To achieve a balanced budget, it is expected that the entire investment allocation of $1,327,285 from the managed accounts will be needed, plus an additional $743,688 from Publications net revenue of $1,222,779. Including the investment allocation, total APS operating revenue ($16,759,837) is expected to exceed total operating expenses resulting in a $479,091 increase in net assets from operations.

Journal Subscription Pricing

Council reviewed the Publications and Finance Committees' recommendations for 2003 journal subscription prices. It should be pointed out that journal publication is the major source of revenue for the Society and is key to our financial well being. In 1995, the Council recommended that the journals' prices be set at a point that generates a margin of approximately 10% to help defray the costs of the various Society programs. The Finance Committee recommended that 2003 subscription prices be raised by an overall rate of 7.3%.

A comparison of 2003 and 2002 domestic institutional prices is shown in Table 1.

Nonmember individual subscription prices will continue to be 2/3 of the domestic institutional price. Beginning in 2002, APS members were provided online access to all journals at no cost.

Society Reserves

The Finance Committee reviewed the performance of the

Table 1. A comparison of 2003 and 2002 domestic institutional prices.

Journal	2003			2002		
	Print + Online	Print Only	Online Only	Print + Online	Print Only	Online Only
AJP Consolidated	$3,065	$2,925	$2,510	$2,855	$2,725	$2,340
AJP-Cell Physiology	575	545	465	535	510	435
AJP-Endocrinology & Metabolism	395	380	325	370	355	305
AJP -Gastrointestinal & Liver Physiology	430	410	355	400	380	330
AJP-Lung Cellular & Molecular Physiology	385	370	315	360	345	295
AJP-Heart & Circulatory Physiology	795	755	650	740	705	605
AJP-Regulatory, Integrative & Comparative Physiology	545	525	450	510	490	420
AJP-Renal Physiology	395	380	325	370	355	305
Journal of Applied Physiology	970	930	795	905	865	740
Physiological Reviews	365	350	300	340	325	280
Journal of Neurophysiology	1,105	1,055	905	1,030	985	845
Physiological Genomics	225	215	190	210	200	175
News in Physiological Sciences	180	175	150	170	165	140
Advances in Physiological Education	N/A	40	N/A	N/A	35	N/A
The Physiologist	N/A	80	N/A	N/A	75	N/A

APS Statement of Activities for the year ended December 31, 2001

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Operating revenue:				
Subscriptions - print	$ 8,988,710	$ -	$ -	$ 8,988,710
Advertising and page charges	2,135,717	-	-	2,135,717
Reprints, single and back issues	1,074,769	-	-	1,074,769
Grants and contracts	884,962	-	-	884,962
Conferences and meetings	401,012	-	-	401,012
Membership dues	628,631	-	-	628,631
Contributions	86,033	114,285	-	200,318
Manuscript handling fees	290,583	-	-	290,583
Other income	180,804	-	-	180,804
Net assets released from restrictions	210,556	(210,556)	-	-
Total operating revenue	14,881,777	(96,271)	-	14,785,506
Operating expenses:				
Publications	11,771,439	-	-	11,771,439
Society general	1,892,300	-	-	1,892,300
Education	505,063	-	-	505,063
Marketing	206,282	-	-	206,282
Society programs	1,197,572	-	-	1,197,572
Total operating expenses	15,572,656	-	-	15,572,656
Operating change in net assets	(690,879)	(96,271)	-	(787,150)
Net realized gains on investments	396,957	-	-	396,957
Net unrealized gains/(losses) on investments	(2,780,700)	-	-	(2,780,700)
Interest and dividends	1,467,385	-	-	1,467,385
Investment management fees	(432,747)	-	-	(432,747)
			-	(1,349,105)
Total Investment Income	(1,349,105)	-	-	
Change in net assets	(2,039,984)	(96,271)	-	(2,136,255)
Net assets, beginning of year	37,681,087	947,798	12,500	38,641,385
Net assets, end of year	$ 35,641,103	$ 851,527	$ 12,500	$ 36,505,130

Society's investment managers. The investments are administered by four managers under the direction of our investment consultant, Salomon Smith Barney. As of December 31, 2001, the accounts had the following market values: Operating Reserve I $11,806,044, Operating Reserve II $9,791,849 Publication Reserve $10,012,190, Second Century Program Fund $2,774,504, Giles F. Filley Memorial Fund $855,028, Caroline tum Suden Fund $584,950, IUPS Fund $352,082, Perkins Memorial Fund $320,429, Shih-Chun Wang Fund $157,440, Rife/Guyton Fund $452,436, and the Lazaro Mandel Fund $153,964. The return on the managed accounts was -4.34% for the year ended December 31, 2001. The return on equities for 2001 was -11.82%, and the return on fixed income investments was 7.91%. The market value of the managed accounts at December 31, 2001 was $37,260,916.

Due to variable performance in the four managed accounts, each manager held between 23% and 29% of all invested assets. Based on a recommendation from the Finance Committee that was approved by Council, the accounts were rebalanced so that each of the four fund managers will be allocated approximately 25% of all assets as of April 30th in accordance with the Society's investment strategy.

Financial Forecast

The Finance Committee presented a three-year financial forecast to Council. The forecast was developed using historical revenue and expense information and also considered known future events. The three-year forecast will be prepared annually for the Spring Finance Committee and Council meetings.

2001 Audit

The Finance Committee received the annual audit performed by Grant Thornton, LLP. In the opinion of the auditors, based on generally accepted accounting principles, the financial statements shown below present fairly the financial position of the Society as of December 31, 2001. ❖

Mordecai Blaustein, Chair

Council accepted the report of the Finance Committee.

International Physiology Committee

The main objective of the International Physiology Committee (IPC) of the American Physiological Society (APS) during the past year was to increase the awareness of Latin American Scientist of the availability of the "Latin American Initiative" program to fund courses/symposia in Latin America. To accomplish this goal the program was advertised to the largest Physiological and Biophysical Societies in Latin American as well as to hundreds of Latin American physiologist via Email. As a result of this campaign the IPC received during 2002 a record number of applications for funding during 2003.

During 2002 the APS funded with $5,000/each the following courses/symposia under the auspices of the "Latin American Initiative":

"Advances in Physiology: Impact on our Understanding of Health and Disease". This symposium was organized by Patricia Molina (LSUHSC, New Orleans), was held at the "Francisco Marroquin" Medical School in Guatemala, and consisted of 12 presentations on various physiological subjects imparted by six scientists from the US and Guatemala. Between each lecture, a clinical case related to the subject was presented by clinical faculty from the US or Guatemala. The symposia attracted 90 participants consisting of medical students, residents and faculty.

"New Insights in Water Transport Across Cells and Membranes: Structure, Function and Regulation" organized by Claudia Capurro (Univ. of Buenos Aires) and Guillermo Whittembury (IVIC, Venezuela). This symposium was held at the "Instituto de Biologia y Medicina Experimental" in Buenos Aires, Argentina in May 2002. It

APS Statement of Financial Position as of December 31, 2001

ASSETS

Cash and cash equivalents	$ 839,978
Investments	38,614,066
Accounts receivable	1,698,403
Accrued interest receivable	202,946
Advances to section editors	449,140
Prepaid expenses	42,759
Furniture, fixtures, and equipment	103,521
Total assets	$ 41,950,813

LIABILITIES AND NET ASSETS

Accounts payable and accrued expenses	$ 837,160
Unearned revenue	
Subscriptions	4,114,370
Dues and other	494,153
Total liabilities	$ 5,445,683
Net Assets:	
Unrestricted	$ 35,641,103
Temporarily restricted	851,527
Permanently restricted	12,500
Total net assets	36,505,130
Total liabilities and net assets	**$ 41,950,813**

was organized in conjunction with the International Congress of Biophysics and consisted of ten presentations from scientists of seven countries and attracted 50 participants.

"Volume Regulation in Animal Cells and in Plant Vacuoles" organized by Mario Parisi (Univ. Buenos Aires) and Gabriela Amodeo (Univ. Buenos Aires). This symposium was held in conjunction with the symposium on water transport described above. It consisted of eight presentations from scientists of five countries.

The IPC has the intention of expanding its activities by requesting the APS Council to create a fund to support the attendance of young Latin American physiologists to attend the Experimental Biology meeting.

The IPC is very pleased to realize that the "Latin American Initiative" is becoming a well-known program in the Americas and looks forward to reviewing an ever-increasing number of high quality applications for courses and symposia to be held in Latin America. ❖

Hector Rasgado-Flores, Chair

Council accepted the report of the International Physiology Committee.

Council approved the requested funding for four new Latin American Initiative proposals for 2003.

Council approved the motion to send the referees' comments of the applications for the Latin American Initiatives to the respective applicants.

Council approved the motion to have the application instructions for the Latin American Initiative being posted in Spanish and Portuguese on the APS web site.

Joint Program Committee

Experimental Biology 2002

EB 2002 was held in New Orleans, LA, April 20 through 24, 2002. All scientific and poster sessions were well-attended and overall enthusiasm for the meeting continues to grow. The success of the meeting is generally thought to be due to the changes that were made to the structure and programming of the meeting several years ago. This includes: *1*) the creation of Section Program Committees (the Chair serving as a member of the Joint Program Committee) to solicit and select symposia and featured topics in their section's area of interest; *2*) increasing the number of symposia sessions by scheduling three- two hour time slots for oral sessions each day of the meeting; *3*) the addition of featured topics to solicit abstracts for oral presentations around coordinated, timely topics; *4*) scheduling a 2.5 hour unopposed poster session each day; and *5*) providing carpeting and signage to the poster exhibit hall. EB 2002 also featured two unopposed Techniques and Technology in Physiology Tutorial/Workshops on Saturday and four "Cross-Sectional" Symposia.

There were seven sponsoring societies at this year's meeting: The American Physiological Society (APS), American Society for Biochemistry and Molecular Biology (ASBMB), American Society for Pharmacology and Experimental Therapeutics (ASPET), American Society for Investigative Pathology (ASIP), American Society for Nutritional Sciences (ASNS), American Association of Immunologists (AAI) and the American Association of Anatomists (AAA). In addition, APS hosted six guest societies: The Microcirculatory Society, the Biomedical Engineering Society, the American Federation for Medical Research, the Society for Experimental Biology and Medicine, the Association of Latin American Physiological Societies and the Spanish Physiological Society. The meeting attendance was excellent. Out of a total of 6,977 volunteered abstracts submitted, 2,444 (35%) were programmed by APS. There were 12,062 registered scientists, 2,022 exhibitors, as well as 452 "other" registrants, for a total attendance of 14,536 persons. Although attendance at the meeting continues to improve, it remains a major concern for EB meetings, not only because it reflects the degree of interest by scientists, but also because exhibitors, who are the major source of revenue from these meetings, are encouraged by good attendance.

EB 2002 was the third year that the meeting was not organized around scientific themes. Themes were eliminated with the understanding that some other process is developed to coordinate "inter-Society" programming. The APS program committee has discussed some ways to address the need for coordinating the program across societies. However, the APS program committee felt that two critical changes have to occur before integrated programming can be realized. First, the meeting structure would have to be standardized so that scientific and poster sessions should occur with common timing and second, abstracts must be in a searchable database. Efforts are continuing to develop cooperative programs among societies. EB 2003 will see a cooperative program between the APS and ASBMB on the NHLBI Programs in Genomic Applications. Each society will program one symposium, each describing four PGA centers. The APS portion will be entitled "NHLBI Programs in Genomic Applications: Information for Physiologists."

The development of EB 2002 continued to implement the recommendations of APS Council to allow for the sections to have more responsibility for developing the scientific program. These recommendations have empowered the membership to create meetings within the EB meeting and highlight the best and hottest science. **Curt Sigmund**, the new chair of the committee has requested all committee members to be "proactive" and to invite scientists doing cutting edge science to develop symposia and featured topics. Each section has a Section Program Committee (SPC) responsible for developing a designated number of

Symposia and "Featured Topics." The Chairs of the SPCs, together with six at-large members comprise a Joint Program Committee charged with the overall quality of the APS program, seeding cross-cutting interdisciplinary "Cross-Sectional Symposia," seeding oral sessions (Featured Topics), clustering and coordination of abstracts for the poster sessions. These changes give members of the Society an opportunity to work within their sections to develop ideas for the program, but some sections are still assessing ways of reaching out to the members to solicit ideas for meetings and conferences. Most sections are making use of their sectional listservers to reach out to their members and we encourage members to contact their section representative if they have not been receiving Email notices requesting ideas. EB 2002 also made use of the "Late-Breaking Abstract" submission in February to maximize inclusion of the late-breaking science at the EB meeting. Feedback on the ability to submit abstracts in February continues to be generally good as represented by the 577 late-breaking abstract submissions.

EB 2002 marked the seventh Physiology In Focus program. Organized by **John Hall**, the program topic "Translating the Genome: Physiology and Pathophysiology of Obesity" included four half-day symposia scheduled throughout the meeting. The symposia presented state-of-the-art research on "Gene Environment Interactions in Obesity," "Neurobiology of Obesity," "Endocrine and Metabolic Consequences of Obesity," and "Obesity and Cardiovascular Regulation." Attendance was outstanding, in many cases filling the meeting room, and the quality of the sessions was outstanding. Plans have been made to ensure that Physiology In Focus will be a highlight at EB 2003, both scientifically and in pre-meeting publicity. The topic for EB 2003 will be Oxidative Stress.

EB 2002 was the third year to introduce two new formats into the program: Techniques and Technology in Physiology Tutorial/Workshops and "Cross-Sectional" Symposia. The intention of the tutorial/workshops is to present current cutting-edge technologies in two half-day sessions addressing "What can be done with the technology" and "How do you use the technology." EB 2002 featured two workshops: "Understanding Organ Function Through Real-Time Fluorescence Microscopy" organized by **J. Bhattacharya** and **B. Pitt**, and "Bioinformatics for the Physiologist" organized by **Peter Tonellato**. The latter workshop was coupled to a symposium entitled "Bioinformatics in Physiological Genomics" which was held on Sunday morning. Both Bioinformatics programs were standing room only. In addition, there were four "Cross-Sectional" Symposia developed to cut across sections: "The Sensory Functions of the DEG/ENaC Superfamily of Ion Channels," "Cell-Cell Cross Talk in the Generation of Inflammation," "Vascular Consequences of Oxidant Stress" and "Translational Research in Pre-eclampsia and Pregnancy-Induced Hypertension." Five cross-sectional symposia will be presented at EB 2003.

Efforts to integrate the APS missions regarding the promotion of the EB meeting and the APS journals by soliciting journal sponsorship of selected oral sessions on the basis of scientific content appropriate for the journal were also pursued. This idea has met with enthusiasm from the Joint Program Committee and will be explored in greater depth with the Publications Committee to foster means of strengthening both the meeting and the journals. In particular, workshops and cross-sectional symposia were targeted areas to consider for publication. In addition, journal sponsorship of stand-alone APS Conferences was discussed and was met with enthusiasm.

Experimental Biology 2003

EB 2003 will be sponsored by six societies: APS, ASBMB, ASPET, ASIP, ASNS, and the AAA. In addition, APS will host four guest societies: the American Federation for Medical Research (AFMR), the Biomedical Engineering Society (BMES), The Microcirculatory Society (MS) and, the Society for Experimental Biology and Medicine (SEBM).

The Joint Program Committee (JPC) met in December to schedule abstracts for the EB 2002 meeting and develop preliminary plans for EB 2003. Preliminary plans were distributed to the Section Program Committees responsible for soliciting proposals. The JPC met on April 20 to review the symposia proposed by the sections to ensure minimum overlap or duplication and to suggest areas of potential coordination. The Committee also reviewed the symposia sponsored by the various guest societies of APS. The committee is to be commended on their efforts to develop outstanding cross sectional symposia. Eleven symposia were reviewed and five were selected for presentation. APS Council approved funding a fifth slot at its meeting on April 24. All but one of them were eventually picked up by one of the sections for sponsorship. It is this proactive activity that will keep the APS portion of EB fresh and exciting. On June 13, the JPC met again to schedule the symposia and featured topics by date and time.

The APS continues to be aware of the importance of including women and members of underrepresented minorities as well as junior scientists on the panels of invited speakers. By and large, the sessions scheduled this year showed this awareness. In addition, through the efforts of the Liaison With Industry Committee, the JPC understands the importance of including researchers from industry as speakers on symposia and featured topics. The Section Program Committees will be advised to remind applicants of these matters in considering participants for future proposals.

The 2003 Physiology In Focus program will include four sessions and is entitled "Physiological Implications of Oxidative and Nitrosative Stress" by **Barbara Horwitz**. Sessions will focus on: "General Overview and Physiological Relevance," "Emerging Concepts in Oxidative and Nitrosative Signaling," "Oxidative Stress: Cardiovascular Consequences," and "Oxidative Stress: Pulmonary Consequences." Planned along with these are approximately 13 symposia and featured topics in the general area of oxidative stress making this a "mini-theme" or the meeting-within-the-meeting. In addition, a workshop/tutorial "Methods to Detect Oxidative and

Nitrosative Stress," organized by **Matt Grisham** and **Joe Granger** is planned for the Friday preceding the meeting.

In addition to the tutorial/workshop above, another is being planned: "Frontiers of Intravital Microscopy: Crossroads of Physiology and Pathology," organized by **Michael Goligorsky**. As indicated above, five Cross Societal/Sectional Symposia are also planned: "Neuron-Glial Interactions in Nervous System Function," "AT-1 and AT-2 Receptors: antagonists in Cellular Action?," "Lineage Specific Programming of Stem Cells into Tissues," "Mitochondria Regulation of Cell Function," and "Peroxisome Proliferator-Activated Receptors (PPARs)." The Translational Physiology Interest Group will sponsor its first symposia entitled "Physiology in Medicine: Renal and Cardiovascular Physiology." In addition there will be 12 Section Distinguished Lectureships, the Bowditch, Cannon and Randall Lectureships. **Paul Kubes** will present the 2003 Bowditch Lecture. Shu Chien will present the 2003 Cannon Lecture. (The 2003 Walter C. Randall lecture has yet to be determined.)

APS Conferences

By and large, this program, which was initiated in 1991, has been very successful and is continuing to improve. The Society is striving for a goal in which the vast majority of scientists will consider APS Conferences a premier meeting to attend. APS Council would like to increase the number of APS Conferences from two to four per year. The additional two conferences are to be organized on Physiological Genomics and Physiology and Medicine: Translational Research. The first of the APS conferences on Physiological Genomics was held earlier this year. The APS Program Committee is actively soliciting ideas for future APS conferences in these two areas and other timely topics.

Scheduled APS Conferences include:

2002 APS Intersociety Conference, August 24-28, "The Power of Comparative Physiology: Evolution, Integration and Applied," organized by **James Hicks**.

2003 APS Physiological Genomics Conference, October 1-4, "Understanding Renal and Cardiovascular Function through Physiological Function," organized by **David Pollock**, **Jennifer Pollock**, **Elizabeth Nabel**, **Clinton Webb**, and **Josephine Briggs**.

2003 APS Translational Research Conference, date to be determined, "Immunological and Pathophysiological Mechanisms in Inflammatory Bowel Disease," date and location to be determined, organized by **Matthew Grisham** and **Fabio Cominelli**.

2003 APS Conference, "Adrenal Steroid Hormone and Control of Extracellular Fluids: from Genetics to Physiology," date and location to be determined, organized by **Daniela Rotin** and **Douglas Eaton**.

2004 APS Intersociety Meeting, "Integrative Biology of Exercise," date and location to be determined, organized by **Ronald Terjung**, Chair. ❖

Curt D. Sigmund, Chair

Council accepted the report of the Joint Program Committee.

Liaison With Industry Committee

The Liaison With Industry Committee (LWIC) met at the Experimental Biology 2002 meeting in New Orleans, LA. The committee is chaired by **Glenn Reinhart** and is composed of representatives from most of the active Society Sections, nominated to serve by their sections. The current committee membership is composed of **Robert McCall,** Neural Control and Autonomic Regulation; **Stephen Wood,** Comparative Physiology; **Brad Zinker,** Environmental and Exercise Physiology; **Peter Morsing,** Renal; **Christine Schnackenburg,** Water and Electrolyte Homeostasis; **Carlos Plata-Salaman,** Central Nervous System; **Amy Halseth,** Endocrinology and Metabolism; **Ken Mandel,** Gastrointestinal; **Jodie Krontiris-Litowitz,** Teaching of Physiology; **Chahraz Montrose-Rafizadeh,** Cell and Molecular Physiology; **Ted Broten,** Cardiovascular). **J.R. Haywood,** APS Councillor, attended.

A workshop titled "Physiology and risk assessment: predicting adverse effects of new chemicals on target organ functions" sponsored by the LWIC was held at EB 2002 on Wednesday at 8 AM. Attendance was light, a fact that at least partly reflected an overall low turn out for Wednesday morning, non-symposia sessions.

The second annual Members in Industry Mixer was held April 22. Attendance was better than last year (>25 people in total) and it was agreed that the mixer should be scheduled for EB '03. The Society (and the LWIC) needs to do a better job of publicizing the mixer, which should lead to increased attendance. The committee would like to obtain the advance registration list in 2003 and consider mailing/Emailing an announcement to members in industry prior to EB 2003.

Novel Disease Model Award: The award typically recognizes one graduate student ($500) and one postdoctoral fellow ($800) submitting the best abstract describing a novel disease model. Five students and one postdoc applied (13 abstracts were received in 2001). The postdoctoral category was not awarded as the abstract was not deemed to sufficiently meet the criteria. Therefore, two graduate students were awarded.

The award and the need to publicize and increase visibility of the award and recipients were discussed. The committee agreed to adjust the process and timelines in 2003 as described below.

1. APS forwards award applications and abstracts to LWIC.
2. Two weeks prior to EB the LWIC will have a conference call to discuss applicants.
3. "Finalist" ribbons will be placed on the posters dur-

ing the EB meeting.

4. LWIC will attend poster presentations (those presenting on the last day will have pre-arranged presentation in one of the APS Committee rooms).

5. The morning of the APS Business meeting (Monday for EB 2003), the LWIC will select the winners during their regularly-scheduled committee meeting. APS Staff will print checks and certificates immediately following LWIC meeting.

All finalists must come to the APS Business Meeting where the winners are announced.

The APS Council Program Committee approved a workshop for EB 2003 entitled, "Recognizing and Applying Critical Translational Assays."

The LWIC received a request to advise Council regarding the apparent shortage of integrative physiologists as it effects APS members in industry (the overall issue is being investigated on a contractual basis by Life Sciences Research Office). The LWIC agrees the shortage of integrative, in vivo physiologists is real, and occurs at all educational levels. The LWIC is currently assisting with this important effort. ❖

Glenn A. Reinhart, Chair

Council accepted the report of the Liaison With Industry Committee.

Council agreed to fund the LWIC mixer for EB 2003.

Council approved the motion to have the LWIC assess the EB 2002 registrants who identify themselves as working in industry, separate by APS member and non-member, and then establish a list-serve of APS-Industry membership.

Council approved a motion to have the LWIC sponsor a workshop at EB 2003.

Long Range Planning Committee

More than three years have now passed since the important planning retreats charted the new directions for physiological genomics, and restructuring of our scientific meetings. It is now time to begin considering other critical issues important to the health of the APS in face of the massive advancements in the biological and computational sciences at this time, and in light of issues that have arisen related in acceptance of international members into the Society.

The Long Range Planning Committee (LRPC) members present at this meeting discussed two important areas important to the future of the APS. The first of these related to structural issues of the Society; the second was related to issues that have emerged given the recent acceptance of international members to our society and an increasing participation of these members in the activities of our society.

Structural Issues:

There was consensus amongst the members present at the LRPC meeting that three issues should be considered for serious discussions by the Society.

1. It was felt that with the growth of APS membership to now over 10,000 members, an increase in the number of councillors representing our membership should be considered. Not only have the number of members in our society increased, but the scientific interests of the memberships during the past 30 years has also changed substantially. For this reason it was recommended that the APS consider expanding the size of elected council members from six to at least nine. It was proposed by **Steve Hebert** that the APS might consider an established number of councillors per 1,000 members so as significant increases in memberships occur, the size of the council will also increase. Although the details of this would clearly have to be worked out, there was a consensus that a greater number of elected council members was now needed to appropriately represent the interests of the membership.

2. It was recommended that a significant effort should be made by the Society to identify emerging areas of science. The committee recommends that the Society should be proactive in fostering newly emerging disciplines (such as computational integrative biology and others) and that meaningful resources of the APS should be provided for these efforts. It was pointed out that with the emergence of a new Institute within the NIH for Biomedical Engineering and with the importance of bioinformatics in the area of physiological genomics, proteomics, etc., that unless the Society makes a strong proactive effort to embrace these emerging disciplines, that most of the scientists involved would end up with the Bioengineering Society and Genetics Societies. Although the APS has done well to respond to the emergence of physiological genomics, it is imperative that we now also consider strongly promoting proteomics, bioengineering, and especially computational integrative biology.

3. The composition and infrastructure of the APS Sections was also considered, a yet unresolved important structural issue facing the society. The LRPC recommended that the APS consider the needs of each of the fields of science represented by these Sections and consider when appropriate, either the renaming of Sections, the restructuring or convergence of Sections, or the addition of new Sections to maintain the scientific vitality of the APS Sections.

Role of APS in International Physiology:

The second major issue discussed at the LRPC meeting was related to considerations and responsibilities that have arisen since APS opened its membership to international scientists. Cowley opened the discussion by emphasizing that the APS has now significantly increased its number of foreign members and should consider the impact of this membership upon the activities of our Society. In discussions of this issue, it was emphasized that the role of the

APS is to promote physiology primarily at the national US level. International members help broaden the scope of the APS programs, meetings and journals and help disseminate US physiological science, concepts, and ideas around the globe. However, given the international nature of science, it was also recognized that the APS must develop a strong and vital link to the world community of physiologists and that this is in the interest of US physiology. The primary mission of the International Union of Physiological Societies (IUPS) is to promote physiology worldwide, giving all physiologists in all parts of the world a fair chance, irrespective of their level of development or of their wealth. In view of these clearly different goals, the relationship of APS and IUPS to physiologists is accordingly quite different. IUPS does not have individual physiologists as members, but rather institutions such as National Physiological Societies (so called adhering bodies). In contrast, the APS, as all physiological societies, has individuals as members, traditionally US physiologists, but now physiologists from all over the world. Many scientific societies have international members and set various standards for membership as is appropriate.

It is important that the national physiological societies around the world not compete with the IUPS but rather each according to their own capacities foster programs and activities of the IUPS of mutual interest. The APS with its expanding number of international members should now seriously consider new and more aggressive ways to help promote these areas of common needs and interests of international physiology.

Toward this end, it was proposed that the APS Council should constitute a task force to make recommendations regarding the role that the APS may play at the international level. It was proposed that the APS International Committee, together with representation from the Council, the Program Committee, the Awards Committee, the Education Committee, and the Long Range Planning Committee be constituted to develop a "White Paper" with recommendations to Council. Such issues as international education initiatives and joint efforts with the IUPS addressing issues of animals experimentation, ethics, public education, etc. could be considered by the task force.

It is important that a clear distinction be made in defining the ways in which the APS can advance and promote international members within our society versus the considerations of how the APS can provide assistance to international physiology by providing assistance through the IUPS. The international efforts coordinated through the IUPS need to be carried out with no strings attached, given the large differentials in respective powers and resources of the APS. In contrast, effects that specifically impact the interests of physiology in the US must be carefully considered and directed by APS Council. An example of how a national scientific society advanced the interests of its foreign membership was noted by Hebert who indicates that the American Society of Nephrology (ASN) financially supports about 30% of invited speakers at its program from foreign countries and about 50% of the awards given within the ASN are to those outside the country. To assist the LRPC in anticipation of the organization of a task force consider these issues, the Committee requested from the APS staff the following information for the last five years:

Ratio of US and Canadian APS members vs. other members.

Ratio of US and Canadian meeting attendees vs. other attendees.

Number of papers published in APS journals from international authors.

How many international awards have been presented to international recipients.

Number of international meetings.

Number of international Chairs/Co-chairs of APS committees.

Number of international editors of APS journals. ❖

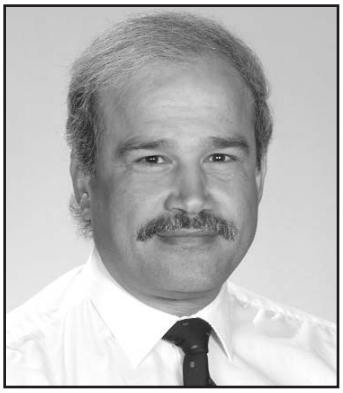
Allen Cowley, Chair

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

Council endorsed the idea that the Committee work with the JPC and the SAC to identify new and emerging areas of disciplines that APS could promote and foster.

Council endorsed the idea that the Committee develop a comprehensive plan to foster APS in the international community.

Membership Committee



The 2001 year has been very successful in terms of recruitment of new members. From April 2001 to June 2002 a total of 643 Regular members have been approved (approximately 20% increase over the previous year). Of the new members 449 are male and 163 female. The degrees held are 457 PhD, 79 MD, 56 MD/PhD, 2 DSc, 1 DVSc, 1 BMs, 14 Dphil, 1 Dodont, 1 MD/DMSc, 6 MSc, 1 MBBS/MD/PhD, 2 DVM, 6 PhD/DVM, 1 DM, 1 DR, 1 DNSc, 1 MD/MPH, 1 MD/FRCP, 2 PhD/DSc, 1 FESC, 1 MDCM, 1 PhD/MPH, 1 MRCP, 1 MBBS, 1 MA, 1 MSE, 1 MBA, 1 EdD. These new members hold a variety of position titles. For example, among the new members in 2001 were 94 Professors, 58 Associate Professors, 130 Assistant Professors, 8 Senior Researchers, 20 Lecturers, 12 Instructors, 16 Research Scientists, 126 Postdoctoral Fellows, 33 Research Associates, 17 Research Fellows, 12 Researchers/Investigators, 18 Research Assistants, 16 Research Directors, 4 Chiefs, 2 Chairpersons, 2 Vice Presidents, one Associate Dean, one Editor, and one Teacher.

The Membership Committee met in New Orleans, at the Experimental Biology 2002 meeting. The primary topic of

discussion at that meeting was how the Committee might best serve the Society in light of duties that go beyond approval of membership applications. The Committee reviewed the membership application approval process to determine if any adjustments were necessary. It was agreed that the current mechanism is working well. The APS Council has previously accepted a recommendation put forth by the Membership Committee that the APS staff be allowed to approve all straight-forward membership applications and that final approval be granted via a Council email ballot on a monthly basis. This procedure has greatly expedited the membership application review and approval process.

Linda Allen shared the newly designed "New Member Packet" with the group. The packet is sent to all newly approved members as of May 2002. The packet contains information about APS committees, sections, chapters, etc. The information included in the packet is designed to get the new members involved in the Society's activities from the very start. Additionally, all new members will now receive a *Certificate of Membership*, signed by the APS President. The Committee agreed the packet is very worthwhile and valuable. The material included in the packet will constantly evolve and will include such items as current press releases, new Society initiatives, etc. The Committee will inform staff of items that should be added to or removed from the packet.

It was noted that the Society needs to maintain communication with current membership—not just with new members—and the information included in the member packet would also be of interest to those constituents. This mechanism should help with member retention, a problem that most societies are facing. However, the cost of mailing a member information packet to every current member would probably be prohibitive.

Discussion arose about how to provide a forum to reach new members on an annual basis. While the new member packet is a start, the need for some type of personal interaction is apparent. After some discussion, it was agreed that the Society could host a "New Comers Coffee" event at the annual meeting where committee and section chairs inform members about opportunities for involvement. The session would be an early-morning event to last about one hour and would not conflict with the scientific sessions.

The benefits of membership were reviewed. It is agreed that membership benefits provide the greatest incentive. While member benefits have been increased (such as the online library of journals and free color prints) the Committee would like to see APS provide a discounted manuscript submission fee and/or page charges to members publishing in APS journals.

The Committee inquired if journal authors are targeted for promotion. Sue Sabur informed the Committee that letters are sent to all nonmember journal authors. The letter is sent under the President's signature. Discussion arose about whether this mailing should include information specific to the related section's activities (e.g. authors of *AJP: Endocrinology and Metabolism* would receive a copy of the Endocrinology & Metabolism Section's newsletter).

Sabur informed the Committee that she exhibits at many scientific meetings throughout the year and this is an excellent venue for recruiting members. Occasionally, journal editors or section leaders will assist her in the booth. The Committee would like to be informed of upcoming exhibitions and, when possible, assist Sabur in the APS Exhibition Booth.

The meeting then focused on mechanisms that can be implemented to increase member involvement/retention. Below is an outline of the ideas discussed:

Each member on the Membership Committee recruits members from inside their department.

Design a "Join the APS" poster and mail to Chairs of Departments of Physiology and possibly other basic and clinical sciences departments. The poster may not have a response card.

Contact Chairs of Departments of Physiology at least one time per year to give them a status report on APS membership and ask for their assistance in promoting the benefits of membership.

Provide links on the APS web site to grants that are available for postdocs (the Society for Developmental Biology web site as an example).

Print the picture of new members in *The Physiologist* and on the web page.

Have a New Members page on the APS web site.

Provide opportunity for members to pay for 3- or 5-years of dues at one time to receive a 5-10% discount (American Heart Association as an example).

Allow members to vote online.

In summary, this is a time of change for the Membership Committee. The duties related to review of applications have been streamlined, freeing up time for the Committee to focus on other important goals, especially those related to recruitment and retention. On behalf of the Committee members, I would like to say that we continue these important duties with great enthusiasm. ❖

Raouf A. Khalil, Chair

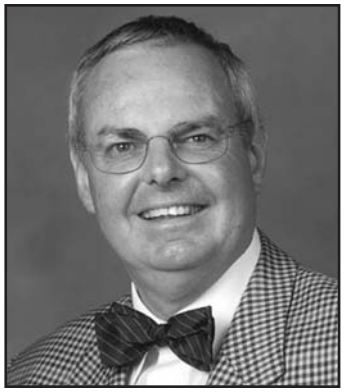
Council accepted the report of the Membership Committee.

Council endorsed the idea of inviting new members to come to the APS office at the EB meetings to meet various members of Council and Committee Chairs.

Council approved a motion develop procedures to allow members to pay for three years of membership dues at one time.

Perkins Memorial Fund Committee

The John F. Perkins Jr. Memorial Fund was established in 1967 to promote the cultural and scientific contacts of the visiting scientist and his/her family during their stay in the United States. No applications were received during the calendar year 2000. Three applications were received in 2001. Two fellowship awards were made: *1*) **Jianquing Du,** hosted in the laboratory of **Mohan K. Raizada** at the



University of Florida, Gainesville, FL; and *2*) **Michael A. Nordstrom,** hosted in the laboratory of **Marc H. Schieber** at Rochester University, NY.

In the coming year the committee will launch several initiatives to increase the visibility of the John F. Perkins Jr. Memorial Fellowship in the US and abroad. By raising awareness of the Perkins Fellowship the committee wishes to revisit one of the founding principles of this fellowship, namely the building of cultural bridges, which seems appropriate and timely in this increasingly polarizing world. ❖

Klaus W. Beyenbach

Council accepted the report of the Perkins Memorial Fund Committee.

Council approved a motion to more rigorously advertise the fellowship.

Council approved a motion to authorize up to $5,000 per award.

Council approved changing the wording in the applications to clarify the deadlines for application submission.

Porter Physiology Development Committee

During the EB meeting the Porter Physiology Development Committee hosted a reception for travel fellows and their mentors and past and current Porter Fellows with the goal of building stronger connections between minority students and the larger community of APS scientists, especially minority scientists. The reception was very successful with approximately 100 people in attendance. Importantly, the reception continued for more than two hours as participants interacted and networked with one another. The Porter Committee requested continued funding of this event.

The Committee served as the review panel for the APS Minority Travel Fellowship Awards. Forty-seven travel fellows were funded to attend EB 2002. Fourteen additional travel fellowships were awarded for the two APS conferences.

Chairs of the Minority Affairs Committees of FASEB societies met at EB 2001 to discuss ways in which the committees could work to increase the participation and visibility of minority scientists at EB meetings. To this end a joint symposium was proposed entitled, "Genomics: A Unified Approach to Solving Diverse Problems in Health and Disease," that was held at EB 2002 supported by FASEB/MARC program. The symposium was an outstanding success and drew a very diverse audience that exceeded the capacity of the room.

The annual meeting of the Porter Physiology Development Committee was also held during EB 2002. The following agenda items were discussed at the meeting: implementation of action items approved by APS Council last year, the impact of the approved increase in stipend level ($15,000 to $18,000) and allowing fellowship supplements from other sources, possible revision of the application process and application deadlines, generating new sources of revenue to support committee goals, and review of fellowship applications.

As of March 31, 2002, the Porter Physiology Development Committee Fund had funds available of $142,147. During 2001, the fund received contributions of $14,500 from Merck, $62,805 from the William Townsend Porter Foundation, $40,000 from APS, $1,610 in private contributions, and $6,204 in interest income.

A goal of the Porter Committee has been to increase the applicant pool. To this end the Committee last year recommended and received approval for an increase in stipend level and the lifting of the restriction preventing supplementation of the stipend from other sources. These changes were recommended so that the Porter Fellowship would be more inline with NIH guidelines for pre-doctoral fellowship awards, thereby making the Porter fellowship more attractive.

The Committee noted a significant increase in the number applications received. The number of new applications from the January '02 deadline rose from four to nine. However, these changes have also reduced the total number of Porter awards available, and, presently, funds are not sufficient to fund all meritorious applications. In addition, given the NIH recommendation of an increase in predoctoral stipends to $26,573 by 2006, the number of Porter fellowships available will decline if the Porter stipend level is to keep pace with these changes. Thus, there is an urgent need to raise additional funds to support Committee goals.

Presently, there are two application deadlines for Porter Fellowships, January 15 and June 15. The January 15 deadline primarily serves renewal applications and applications from predoctoral students currently in their programs. The June 15 deadline serves predoctoral students who have an unanticipated need or incoming predoctoral students for the fall. This year, the Committee received more new fellowship applications in June than in previous years. Given the funding available (enough for eight-nine fellowships), several meritorious applications were not approved because of limited funding. The decision was made to defer some funding decisions so that there would be sufficient funds available for awards for the June 2002 applicant pool. Similarly, the designation of the Merck and Ison-Franklin fellows was also deferred to include the June

awardees. In the future, the Committee may need to reconsider the Porter Fellowship application deadlines in an attempt to alleviate this problem.

The Porter Physiology Development Committee reviewed four renewal applications and nine new applications from the January 15, 2002 application deadline. All of the renewal applicants were awarded second year fellowships. Three new fellowships were awarded; decisions for three were deferred until the June cycle, and the remaining three were not approved. Deferred applicants were informed that their applications would be reviewed with the June applications. Deferred applicants were also invited to revise/update their applications prior to the June 15 deadline.

The new 2001 Porter Physiology Development Fellows are **Rashad Belin**, third year PhD student, Department of Physiology and Biophysics, University of Illinois at Chicago; mentor: **P. de Tombe**; **Becky Marquez**, fourth year PhD student, Department of Physiology, Cornell University; mentor: **Susan Suarez**; **Nivalda Rodrigues-Pinguet**, fourth year PhD student, Division of Biomedical Sciences, University of California, Riverside, and Department of Biology, California Institute for Technology; mentor: **Henry Lester**. The renewing Porter Fellows are **Maurice Williams**, fourth year PhD student, Department of Integrative Physiology, University of North Texas Health Science Center at Forth Worth; mentor: **Patricia A Gwirtz**; **Carmen Padro**, fourth year PhD student, Department of Physiology, University of Puerto Rico; mentor: **Miguel Rivera**; **Wendy Brisbon**, thrid year PhD student, Department of Anatomy and Physiology, Meharry Medical College; mentor: **John T. Clark**; **Jorge Gonzalez-Perez**, second year PhD student, Department of Pharmacology, University of Puerto Rico; mentor: **M. Crespo.**

Final reports were received from **Marcelo Febo-Vega**, PhD expected 2002, Department of Physiology and Biophysics, University of Puerto Rico School of Medicine, mentor: **Annabell Segarra**; **Annelyn Torres-Reveron**, PhD candidate, Department of Physiology, Ponce School of Medicine; mentor: **Gregory Quirk**; **Sonia Houston**, PhD completed, Department of Physiology, University of Missouri-Columbia; mentor: **Virginia Huxely**; **Lisa Hernandez**, PhD candidate, Department of Physiology, University of California-Davis; mentor: **Saul Schaefer**.

The progress reports from the 2001-2002 Porter Fellows clearly attest to the Fellows' high level of achievement. The Committee expresses great pride in the role the Society has played in the development of these outstanding young scientists and its continued support of this goal. ❖

Pamela J. Gunter-Smith, Co-Chair

Council accepted the report of the Porter Physiology Development Committee.

Council endorsed the idea of providing additional funding pending receipt of matching funds from the Porter Foundation.

Council approved the idea of using APS members local to the New Orleans area to be judges at the Annual Biomedical Research Conference for Minority Students.

Council approved funding for a reception for current and former Porter Fellows and Minority Travel Fellows at EB 2003.

Public Affairs Committee

The Public Affairs Committee advises the APS Council on policy issues and how best to address them. The Committee also informs Council of specific initiatives undertaken by the Committee itself. The Committee recognizes the importance of careful integration of its activities with the Animal Care and Experimentation Committee, the Communications Committee, and with the Science Policy Committee of FASEB. It has worked closely with these groups to achieve common goals. Likewise, the Public Affairs Committee works closely with the APS Office of Public Affairs both to coordinate activities and to more effectively communicate relevant issues to Council and, when appropriate, to the general membership.

The past year has been one of extraordinary change. The impact of events on September 11, 2001, has been far reaching and could not have been anticipated. Those events have colored many of the Public Affairs Committee's actions and will continue to do so for the foreseeable future. The climate at the NIH has itself changed, not only as a result of 9/11 but also in the appointment of Elias Zerhouni as the new NIH Director who began his tenure on May 20, 2002.

Funding issues remain are a major focus of the Public Affairs Committee. During the past year the Public Affairs Committee assisted Council in developing policy statements regarding: *1)* completion of the effort to double the NIH budget in five years; *2)* planning for the period after completion of doubling the NIH budget; and *3)* Congressional support for VA, NSF, and NASA funding. In the coming year the Public Affairs Committee will work

with Council to address the concerns raised by the Administration's initiative to combat bioterrorism in part by directing NIH resources in that direction.

The Public Affairs Committee has, in the past year, focused attention on stipends provided to trainees. After discussions with NIH representatives and at APS President John Hall's request, the Committee prepared a letter that dealt with NIH-sponsored support of trainees. The APS supported the current effort to increase trainee stipends while encouraging the NIH to pay close attention to the impact of such increases on current academic and research training programs. The letter was sent to Dr. Walter Schaeffer, Research Training Officer at NIH on October 9, 2001. The Committee, through one of its action groups, continues to monitor this issue and provide advice to Council regarding future action.

NIH peer review continues to receive the Committee's attention. Two paramount concerns remain. The first is the process of "streamlining" grant applications and the second is reorganization of the peer review process. The Public Affairs Committee, working with FASEB's Science Policy Committee, is addressing the issue of streamlining, inconsistencies in the process, education of executives who oversee the process, and appropriate application of existing NIH guidelines for managing the process. The Scientific Boundaries Panel Report that recommended methods of reorganizing the peer review process is available on the NIH web site at http://www.csr.nih.gov/events/summary012000.htm. Institution of the boundaries policy continues to be the Public Affairs Committee's great concern. The Committee, working with Council, seeks to monitor application of the boundaries report, to advise NIH with regard to areas where application of that report may lead to suboptimal peer review and improving the communication between APS and NIH when the latter seeks input both on the reorganization and on specific experts who might serve NIH in the design and implementation of the new peer review system.

In the past year the APS Office of Public Affairs has developed an outstanding Legislative Action Center on the APS Public Affairs web page. The APS Legislative Action Center not only provides timely information on issues related to research funding and animal research but also assists members in becoming active in the public policy arena. One very useful feature is the "E-Sheet" at http://www.the-aps.org/pub_affairs/leg_act_cntr/congressional_meeting_e.htm. This is an online guide to help you prepare for meetings with your Senators and Representatives. The most recent innovation is software that enables APS members to "Take Action" by sending personalized letters to their elected representatives using texts prepared by the Office of Public Affairs.

As this past year has proven, issues in the public affairs arena can change quickly, dramatically, and unpredictably. The Public Affairs Committee continues in its efforts to serve APS and to meet those challenges. ❖

William T. Talman, Chair

Council accepted the report of the Public Affairs Committee.

Council endorsed the idea of requiring future chairs of the Committee to have had prior Public Affairs Committee experience.

Council endorsed the idea of developing a relationship with the NIH institute directors or associate directors so that APS will be able to nominate candidates for open positions on the directors' advisory committees.

Publications Committee

APS Journal Impact

Impact Factors. Almost all the journals saw an increase in their 2000 Impact Factors. The Editors continue to invite content that will improve the journals' impact.

Reports. "Reports," which are meant to be short articles of high impact, replaced the previous article type, "Rapid Communications," in October 2001. Papers submitted to this category are designed to present the best original scientific research having broad significance. The primary criteria for judging the acceptability of a manuscript are originality, scientific importance, and broad interest. Manuscripts judged lacking in these aspects will be declined even if the experimental work is technically sound. These articles will be limited to no more than three printed journal pages (~2,500 words). As of March 15, 2002, eight were in peer review, four accepted for publication, and one published.

Publication Efficiency

Articles in PresS. Immediate publication of accepted research articles in manuscript form began in July 2001 with *American Journal of Physiology-Renal Physiology*, with the rest of the journals that are peer reviewed through *APS Central* following shortly thereafter. A total of 604 Articles in PresS were published in 2001.

S-Proof. S-proof has been very well-received by authors and has helped us with our continuing efforts to decrease time to publication.

Financial Stability and Increased Accessibility

Subscription Prices. Subscription prices for 2003 were set for the second year using the "new" pricing model that was approved by the Council in March 2001, which unbundles prices so that subscribers can choose print only, print plus online, or online only. The 2003 prices were set taking into consideration increases in cost and a budgeted decrease in the number of subscriptions of 6%. The Committee and Council approved a price increase for all journals of 7.3%.

Legacy Data. Work has begun on scanning the content

back to 1985 for the first stage of putting all journal content online by the end of 2004. Council approved selling the legacy content as a package for a one-time fee of $1,500. It is available free to APS members in good standing.

Reducing Member Costs

APS members are given free online access to all the journals and will be given free access to the APS Legacy Content when it is online. As was reported at the last meeting, APS members continue to take increased advantage of the free color policy. In 2001, $225,750 of free color was given to members, up from $182,000, in 2000.

Electronic *Handbook of Physiology*

Book Advisory Committee. **Marshall (Chip) Montrose** of Indiana University has agreed to Chair the Book Advisory Committee. The Committee will be charged with writing its charter to be presented to the Publications Committee, and with developing a plan to create an electronic *Handbook of Physiology*. The Committee is looking into the value of including older Handbooks online as Legacy Content, and is developing Calls for Editors of previous Handbooks that need new editions.

Electronic Supplemental Material

Supplemental Material. Five video clips were published in 2001. Four more are in production to be published in 2002. Approximately 20 long data tables have been published as supplemental material to articles in *Physiological Genomics*.

Bundling Review Articles. It is now possible to go to the journal home page and link to a table of contents of all review articles in each individual journal or all the APS journals (except *NIPS* and *PRV*) across time.

Physiology Taxonomy. HighWire has redesigned their home page to be a portal to all the journal content on their site. Volunteers from APS helped create the physiology taxonomy that makes the physiology portion of the search engine a rich search tool.

STKE and SAGE. APS continues to participate in AAAS's Knowledge Environments, allowing APS journal content to be part of the Signal Transduction Knowledge Environment (STKE) and giving our members the same AAAS membership discount to its subscriptions, and allowing our journal content to be linked to the new Science of Aging Knowledge Environment (SAGE) at a pay per view price for non-subscribers.

Translational Research

Call for Papers. A Call for Papers on Translational Physiology has been running in all the Journals since June 2001. As of March 15, 2002, 29 have been submitted, 12 accepted, and 12 published. Editors have been encouraged to label any paper that can be considered a translational research paper as such, even if it is not submitted in response to the call, and APS staff will add the banner to that paper. This will allow for online searching across all the APS journals for translational research papers.

Physiology in Medicine (PIM). An agreement was made in 2001 to publish the Physiology in Medicine series in *Annals of Internal Medicine*, with **Dennis Ausiello**, Harvard Medical School, as the Editor of the series; **Dale Benos** will serve as Deputy Editor. **Frank Abboud** of University of Iowa, **Mark Fishman** of Harvard Medical School, and **Bill Koopman** of University of Alabama at Birmingham are serving as Associate Editors. The first article in the series will be published this summer.

Editor Appointments and APS Central Implementation

Dennis Brown became Editor of *American Journal of Physiology-Cell* in July 2002. **Eve Marder** became Editor of *Journal of Neurophysiology* in July 2002, and that journal will start using APS Central for peer review at that time. **Gary Sieck** began his second term as Editor of *Journal of Applied Physiology* in July 2002. **Ole Petersen** has been chosen to be the Chair of *PRV's* European Committee, starting January 2003. The Editors of *AJP-Lung* and *PRV* will be evaluated at the Fall 2002 meeting. ❖

Dale Benos, Chair

Council accepted the report of the Publications Committee.

Council approved the Committee's recommended changes to the APS Ethical Procedures policy.

Section Advisory Committee

The Section Advisory Committee (SAC) met separately and in joint-session with the APS Council on Friday, April 19, 2002 prior to the Experimental Biology meeting in New Orleans. All Sections were represented at the afternoon meeting of SAC. Topics discussed included: *1*) Section Reports, *2*) Nominations for next SAC chair, *3*) Programming, *4*) Finances, and *5*) Awards. During the joint meeting with Council, there was discussion of strategic issues and **John Hall** asked each section to identify their top critical concern.

Section Reports

All of the sections submitted detailed reports on their activities during the past year. These reports were transmitted to Council at the joint-meeting on April 19, 2002. Several aspects of these reports suggested common concerns amongst the sections and these were discussed:

Section Steering Committee Membership: There appeared to be a common problem in identifying committed members for section steering committees. While some sections are doing very well with this, others have been struggling. The CNS Section asked for suggestions from other sections and reported that it has adopted a strategy for removing inactive steering committee members from the steering committee. Specifically, attendance at a certain number of

steering committee meetings is required in order to remain on the committee.

Candidates for Committee Membership: It was noted that the sections can do a better job of nominating strong candidates for APS committee service. Sections should urge their members to nominate candidates for all committees. It was noted that nomination letters should be personalized and not merely carbon copies of the templates provided by the Section, because these do not have the same impact on the COC as a personalized letter.

EB Meeting Abstract-Based Awards

There was concern about the lack of award applications for the Young Investigator Travel Awards. It was requested that the Call for Papers heading on the APS Awards Page be changed to read "Abstract-Based Awards," thereby removing the reference to student/postdocs. This is because the Section Young Investigator awards are largely offered to those advanced beyond postdoc status. It is believed that many people eligible for the YIAs are not applying because they are not reading the criteria for the awards, thinking they are not relevant to them.

Nominations for Next SAC Chair

Sladek's term as SAC chair expires on December 31, 2002. The Society bylaws state that the SAC shall elect the chairperson. Council requested SAC develop a slate of candidates to be placed on the ballot. SAC forwarded the names of the following five individuals to Council:

Sue Barman, Central Nervous System Section
Paul DeWeer, Cell & Molecular Physiology Section
Robert Gunn, Cell & Molecular Physiology Section
Helen Raybould, Gastrointestinal Section
Jeff Sands, Renal Section

From this list, council nominated two individuals for the final ballot, **Sue Barman** and **Jeff Sands.** Marty Frank will collect biographical information and send a ballot to SAC for the final election.

Programming

The Section Program Committees are functioning well and it was felt that the programming at EB has continued to be exciting and high quality. Sections are continuing to use their newletters to advertise their programming contributions to their members. One of the issues that was discussed during the combined SAC/Council meeting was the need to coordinate programming between APS and the other societies that are represented at EB. A mechanism needs to be developed for sections to be aware of the other society programmatic offerings in a timely way in order to incorporate that information into newsletters, etc. This could enhance the 'meeting within a meeting' approach and make EB more enticing to section members.

The Translational Physiology Initiative including the goal to incorporate more translational programming at EB was discussed. SAC noted that there are relatively few intersectional slots allocated to the EB meeting. Therefore, each section should try to incorporate translational research aspects into their programming. Sections should also encourage manuscript submissions on disease models.

Featured Topics. EB 2002 marks the first year where each section received the funds for their featured topics to distribute as they please. In light of the new process, letters mailed by the Society should remove all funding references and simply state that the section should be contacted.

Action Item:

Sections would like to have the Society provide complimentary registration for invited speakers in featured topics, over and above the $1,000 currently provided.

IUPS programming issues were discussed. Sladek distributed the list of individuals chairing the IUPS commissions and encouraged the sections to begin to communicate with the appropriate IUPS commission(s) in order to begin early discussions about program ideas.

Finances

Linda Allen provided each section with information about their APS accounts, and reminded SAC that, based on the recommendation of the Task Force on Sections, the section accounts have been converted to discretionary accounts into which the money previously allocated for activities with the Distinguished Lecturer ($2,000) and the $1,000 allotment for each featured topic is deposited annually. The sections have the discretion to distribute these funds amongst these activities as is needed. Unused funds can be carried over into future years.

Awards

Young Investigator Award for Assistant Professors: SAC discussed appropriate guidelines and criteria for the new Young Investigator Award for individuals at the Assistant Professor level that was proposed by the Task Force on Sections. These awards would be presented annually, one per section, and would consist of a $1,000 honorarium and complimentary advance registration at EB. **Bill Chilian, Mike Jennings,** and **Stan Lindstedt** agreed to develop guidelines and criteria for presentation to Council.

Selection of Bowditch and Cannon Lecturers: SAC discussed the request from Council to provide recommendations for the Bowditch and Cannon Lecturers. SAC recommends that the awards be better marketed to the membership, asking them for nominations. Specifically, it is suggested that a postcard mailing be done each year to solicit names for these awards. SAC would also be willing to identify individuals from their section and provide the supporting documentation.

New Business

Establish new pages on the APS web site for job and equipment listings.

Action Item:

SAC recommends that APS develop new pages on the APS site for advertising equipment exchanges. One page would be designed to advertise equipment that investigators are no longer using and would be willing to exchange or sell. This would be particularly useful for specialized items that are no longer available, but other investigators need. ❖

Celia Sladek, Chair

Council accepted the report of the Section Advisory Committee.

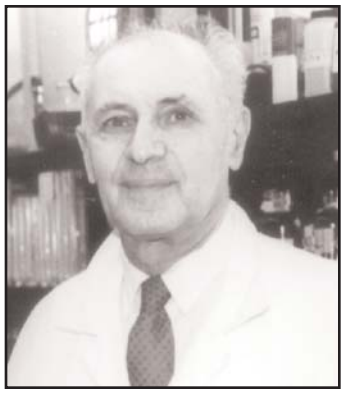
Council approved the requested funding for complimentary advanced registration for section award recipients at the EB meetings.

Council approved the requested funding for complimentary advanced registration for invited speakers in featured topics.

Council approved a motion of establishing a page on the APS web site for listing equipment available for exchange/sale/donation.

Council approved the recommended criteria, with some changes, for the Section Young Investigator Awards.

Senior Physiologists Committee



The renewed Committee aimed to continue the traditional trend, i.e., to greet members of 70-, 80- and 90-years old. For the first time, two 100-years old members were also scheduled for the greeting; however, it turned out that they had passed away already. Following the suggestion of the Committee, APS adapted a new procedure to verify the location of its emeritus members.

About 180 greetings were sent out, either as personal letters, or on the special artistic cards of APS. Along with the greetings, senior members were requested to write an article to *The Physiologist* to pass their experience and wisdom to the younger colleagues. About one-fourth of the members replied. Interestingly, many leading physiologists refuse to write articles becuase these would reveal their age.

The Committee also reviewed a few applications for the Senior Physiologists Award (G. Edgar Folk, Jr. Senior Physiologist Grant), $500, mainly supporting research or meeting attendance. Four applications were approved. ❖

Michael Bárány, Chair

Council accepted the report of the Senior Physiologists Committee.

Women in Physiology Committee

The Women in Physiology Committee has embarked on several new activities to fulfill its charge to mentor young scientists and provide incentives to them to present their work at APS meetings. Highlighting these activities are a proposal to establish a Distinguished Mentor and Scientist Award and a very successful workshop co-sponsored by the ASPET Committee on Women in Pharmacology at EB '02.

The committee has proposed to Council the establishment of a Distinguished Mentor and Scientist Award named after former APS President **Bodil Schmidt-Nielsen**. The award fulfills a function of the committee by recognizing excellence in mentorship, thus, encouraging young scientists in the early stages of their careers. The award recognizes a mentor and scientist of either gender. Nominations will be submitted to the Women in Physiology Committee, which will select the awardee. The award will carry a $500 cash prize. The awardee is expected to write an article for *The Physiologist* and to meet with Caroline tum Suden awardees and other young scientists and their mentors at a roundtable discussion to be held during the EB meeting. The roundtable discussion offers, as well, a convenient venue for one-on-one meetings of mentors and mentees.

The Women in Physiology Committee has, as one of its charges, the development and promotion of careers of young scientists in the discipline of physiology. The committee has recommended in the past and is now very pleased that the APS Mentoring Program is available to both female and male young scientists. The program is designed to provide advice, encouragement, support and networking opportunities for young scientists who are currently in training or have just started a new position in academe or industry. The APS Education Office has now completed a revision of the APS Mentoring Program website, which is an interactive and user-friendly site with many sources of information for young scientists at the formative stages of their careers as well as for senior physiologist mentors in the program. The committee reviewed the website and provided their comments. Additional actions were taken to upgrade the mentoring program. Former mentors were directly contacted by mail to request their renewed participation. Next, student members of the APS will be contacted by Email to encourage them to join the program. We noted that requests for mentors are submitted year round from students of both genders. To facilitate matching of mentor and mentees, the committee will take an active role in the selection process. On a rotating quarterly basis, committee members will receive and evaluate information on the research interests and expertise, career paths, and area designated by the mentee for advice and counsel. These criteria for pairing a mentee and mentor are modifications of past criteria. The changes were driven by many mentees who were seeking advice on career issues, other than scientific training. The goal of the Women in Physiology Committee is to match mentor-mentees as soon as possible, thus enhancing the value of the mentor-mentee relationship. This approach should also provide encouragement to mentor-mentees to meet directly at the Fall APS

conferences and EB meeting. The Committee also highly commend Marsha Matyas and Melinda Lowy for their exceptional efforts in redesigning the website. Society members are encouraged to participate in the program as either mentor or mentee; applications are available from the Society's Education Officer, Marsha Matyas, and on the program website at http://www.the-aps.org/education/mentoringprogram.

The committee also sponsored a Mentoring Program breakfast at EB '02 as an opportunity for face-to-face meetings of mentor-mentee pairs. The breakfast was held on the first day of the meeting in order to facilitate further interactions between mentors and mentees during the meeting. The highlight of this breakfast was a brief talk by our invited speaker, Eldon Braun (Univ. of Arizona) on the mentor-mentee relationship. Balancing Braun's talk was a presentation by one of his former mentees who offered several examples of their experience in the APS Mentoring Program. Attendance at the breakfast was poor for several reasons, including the separation of rooms for breakfast and the mentoring workshop. The committee decided to discontinue the Mentoring Program Breakfast and to foster participation of young scientists at the Women in Physiology Committee workshop and roundtable discussion with the Distinguished Mentor and Scientist Awardee.

One of the charges to the committee is to coordinate activities with other such committees within the FASEB organization. The committee took the initiative to plan and co-sponsor a Workshop with the ASPET Committee on Women in Pharmacology at EB '02 on "How to be a Good Mentor; How to be a Good Mentee." Two representatives from the Women in Physiology Committee (**Susan Barman** and **Robin Davisson**) and two from the Committee on Women in Pharmacology (**Margarita Contreras** and **Pat Kantak**) served as co-organizers. The workshop was designed to provide training for mentors and mentees of both genders on the mentoring process. Over 150 young plus some more senior scientists were able to gain valuable insight on the role of mentors and mentees through oral presentations, case studies and a handout distributed at the session. Plans are underway to make the slides used by the panelists, as well as the handout material, available on the APS and ASPET websites. Plans are underway to co-sponsor with the ASPET Committee on Women in Pharmacology a workshop on "Presentation Skills" at EB '03 in San Diego.

The committee has the pleasure of serving as the review panel for the Caroline tum Suden/Frances Hellebrandt Professional Opportunity Awards. These awards provide monetary ($500) prizes and complimentary registration for 36 graduate students and postdoctoral fellows (of either gender) who give presentations at the EB meeting. The committee critically reviews abstracts submitted to EB and a supporting letter from the applicant in its selection process. Society members are strongly encouraged to remind their trainees of this opportunity.

As committee chair, Liedtke serves as the APS representative to the selection committee for this FASEB Excellence in Science Award. This prestigious award carries a $10,000 cash prize (supported by Eli-Lily) and the opportunity to present a plenary talk at a FASEB-sponsored meeting. For EB '02, the recipient was **Phyllis M. Wise**, Chair of the Department of Physiology at University of Kentucky, an APS member. The committee encourages all APS members to identify potential candidates for this prestigious award and, as one small step in this direction, to nominate women to give Distinguished Lectures organized by the various sections of APS. Less than 10% of the Distinguished Lecturers since 1995 have been women.

One of the charges to the Women in Physiology Committee is to encourage women to be active members of the APS. One way to be active is to serve on APS Committees and APS Section Steering Committees. At its Business meeting, the committee discussed the process of being selected to serve on APS Committees, Sections, and Council. The committee is delighted that this year for the first time since 1975 a woman (**Barbara Horwitz**) is serving as President. Two women currently serve on APS council (**Kim Barrett** and **Virginia Miller**). We congratulate **Hannah Carey** and **Jo Rae Wright** for their service to APS Council that was completed as of EB '02. On another positive note, the committee learned that more women are now serving on and chairing committees and are elected to section leadership positions. Sadly, it was noted that no women were on the ballot this year for President-elect. ❖

Carole Liedtke, Chair

Council accepted the report of the Women in Physiology Committee.

Council endorsed the idea of a new award—the Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Award. The Committee will develop the award criteria and submit it to Council for approval.

Get Involved with an APS Committee

The APS Committees are always looking for new people to get involved. Visit the APS Committee web pages to learn more about the interests of the individual committees at http://www.the-aps.org/committees.htm.

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

Shu Chien
University of California, San Diego

"To Be Determined"

FRIDAY, APRIL 11, 5:45 PM

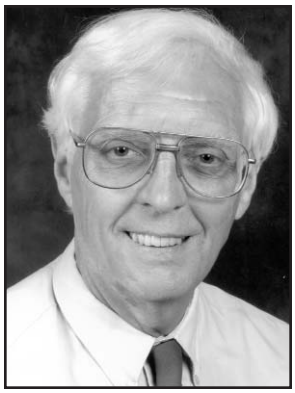
HENRY PICKERING BOWDITCH AWARD LECTURE

Paul Kubes
University of Calgary

"Molecular Mechanisms Underlying Leukocyte Recruitment in the Microcirculation"

SATURDAY, APRIL 12, 5:45 PM

Distinguished Lectureships



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

John Coote,
University of Birmingham, UK

"The Significance for Circulatory Control of the Paraventricular Nucleus"

SATURDAY, APRIL 12, 10:30 AM

CLAUDE BERNARD DISTINGUISHED LECTURESHIP OF THE TEACHING OF PHYSIOLOGY SECTION

John D. Bransford
Vanderbilt University

"When Knowledge of How People Learn Meets Classrooms and Technology: Issues and Opportunities"

SATURDAY, APRIL 12, 2:00 PM

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

John B. West
University of California, San Diego

"Thoughts on the Blood-Gas Barrier"

SATURDAY, APRIL 12, 2:00 PM

CARL W. GOTTSCHALK DISTINGUISHED LECTURESHIP OF THE RENAL SECTION

William J. Arendshorst
University of North Carolina

"Reactivity of the Renal Microcirculation in Genetic Hypertension"

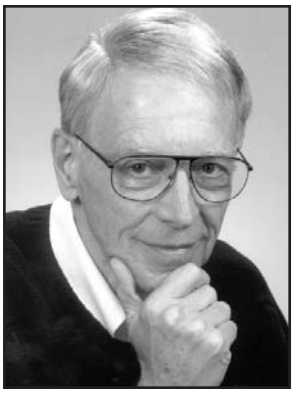
SATURDAY, APRIL 12, 3:15 PM

AUGUST KROGH DISTINGUISHED LECTURESHIP OF THE COMPARATIVE PHYSIOLOGY SECTION

Peter Scheid
Ruhr University, Bochum, Germany

"The Goose of the Himalaya and Central Chemosensitivity; New Ideas From an Old Problem"

SUNDAY, APRIL 13, 9:00 AM

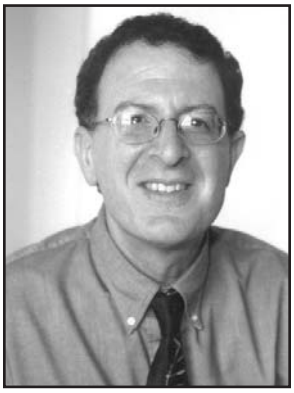


ROBERT M. BERNE DISTINGUISHED LECTURESHIP OF THE CARDIOVASCULAR SECTION

Eric O. Feigl
University of Washington

"Berne's Adenosine Hypothesis of Coronary Blood Flow Control"

SUNDAY, APRIL 13, 10:30 AM



HORACE W. DAVENPORT DISTINGUISHED LECTURESHIP OF THE GASTROINTESTINAL SECTION

Jeffrey I. Gordon,
Washington University

"Living With Microbes: An Inside View"

SUNDAY, APRIL 13, 2:00 PM

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

Jere Mitchell
University of Texas, Southwestern Medical School

"Neural Circulatory Control During Exercise: Insights From Animal and Human Studies"

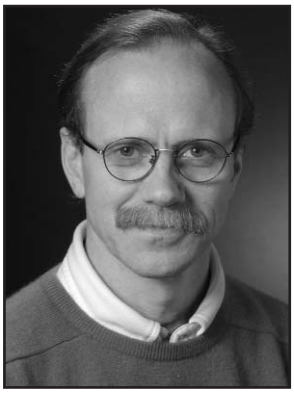
MONDAY, APRIL 14, 8:00 AM

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

Friedrich C. Luft
Humboldt University, Berlin

"The Role of Genetic Models in Elucidating Cardiovascular Reflex Regulation"

MONDAY, APRIL 14, 10:50 AM



JOSEPH ERLANGER DISTINGUISHED LECTURESHIP OF THE CENTRAL NERVOUS SYSTEM SECTION

Fred H. (Rusty) Gage
The Salk Institute

"Regulation and Function of Adult Neurogenesis"

MONDAY, APRIL 14, 2:00 PM

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

Christopher B. Newgard
Duke University

"Mechanisms of Fuel-Stimulated Insulin Secretion and How They Fail in Diabetes"

MONDAY, APRIL 14, 3:15 PM

HUGH DAVSON DISTINGUISHED LECTURESHIP OF THE CELL AND MOLECULAR PHYSIOLOGY SECTION

Roger Y. Tsien
University of California, San Diego

"Unlocking Cell Secrets With Light Beams and Molecular Spies"

MONDAY, APRIL 14, 3:15 PM

Experimental Biology 2003
Abstract Submission Deadline
November 13, 2002

April 11-15, 2003, San Diego, CA

Lineage Specific Programming of Stem Cells into Tissues

APS Cross Sectional Symposium

Qais Al-Aqwati
C. Verfaille, R. McKay, Q. Al Awqati, L. Zon

The goal of this symposium is to provide an update on Stem cell biology and the genetic program that underlies the distinctive physiologic functions of differentiated tissues. All specialized tissues including kidney, brain, heart, endothelium and blood originate from a single cell. The generation of tissue diversity depends upon coordinated sequential genetic programming of the progeny of this cell resulting in the differentiated phenotype in specific tissues. Following organogenesis, each tissue is not only able to replenish its constituent cells over the lifetime of the organism, but also to regenerate in response to injury. These processes depend upon the persistence of a small reservoir of stem cells capable of providing an endless supply of differentiating cells to repopulate the each organ. The participants of this symposium will overview recent insights into the mechanisms by which cells acquire tissue specific programs. McKay will overview stem cells and the signals that result in their neuronal differentiation, focusing on refined approaches to physiological characterization of their neuronal lineage for treatment of Parkinson's disease. Verfaillie's group has identified a unique antigenically marked human marrow derived progenitor cell that differentiates into endothelium and contributes to angiogenesis in vivo. Zon will discuss the genetic programming of hematopoeitic progenitor cells to form red blood cells. Using ENU mutagenesis his group has defined 26 unique genes required for hematopoeisis. Several of these genes are also required for normal vasculogenesis, CNS function and renal development of the kidney. Finally Al-Awqati will discuss evidence for stem cell niches in the kidney and the antigenic and functional features that define these hitherto elusive cells. Through this discussion, the audience will be apprised of the interface between stem cell biology and organ physiology.

Career Planning for Experimental Biology, Biomedical and Physician Scientists

Society for Experimental Biology and Medicine

Kenneth L. Barker
B. I. Shapiro, R. P. Kelch, M. S. O'Dorisio

Career opportunities for experimental biologists, biomedical scientists and physician-scientists have changed over the past few years. Driving these changes are: *1*) the rapid private sector application of new experimental biology discoveries conceived in university laboratories to diagnose and treat human, other animal and plant diseases, and to generate new products, *2*) the unprecedented growth in research funding from both public and private sources, *3*) the increased dependency by universities on soft money sources such as research grants, clinical income and intellectual property for support of faculty, *4*) the expanded complexity of experimental biology research that now requires very expensive, rapidly changing technologies and equipment, and a collaborative research-team approach to accomplish, and *5*) the growing importance of translational investigators, particularly physician-scientists, who can facilitate the rapid application of new fundamental findings toward new clinical applications. These forces mean that a growing proportion of newly trained experimental and biomedical scientists will be employed by industry instead of by universities, there will be an increased demand on the time of those who take academic positions to generate their own salary support from research grants and clinical income, there will be a loss of job security that can provide meaningful bridge support between grants in times of economic down-turn, there will be a loss of opportunity to function and be recognized as an independent investigator, and there will be a general reduction in the reciprocal commitment and loyalty between the scientist and his or her employer. Scientists-in-training must be aware of the reality of these trends and prepare for both the complications and special opportunities these issues will present during their career. This symposium will present the career planning perspectives and recommendations of a university administrator (medical school dean), an industry person responsible for hiring biological and biomedical scientists for his/her company (personnel director), a granting agency program administrator who is knowledgeable about the training of physician-scientists (NIH-MSTP program officer), and a biomedical scientist who is making his/her way in this complicated new academic/research/clinical environment.

Peer Review and Publication in APS Journals

APS Publications Committee

Dale Benos
D. Benos, M. Reich, A. Trudgett

Modulation of Respiratory Motoneurons from Molecules to Behavior

APS Respiration Section

Albert J. Berger
L. Kubin, D. A. Bayliss, A. J. Berger, R. L. Horner,

Modulation of respiratory motoneurons by endogenous and exogenous substances can profoundly alter motoneuron behavior. In recent years state-dependent modulation of hypoglossal motoneurons (HMs) is thought to be a key factor in obstructive sleep apnea (OSA). The relative contribution to the sleep-state-dependent reduction in HM excitability by two mechanisms, one disfacilitation (withdrawal of serotonergic and adrenergic facilitatory inputs) and the other enhanced active inhibition (primarily glycinergic) is controversial. The four speakers will present their results exploring how these two mechanisms can lead to a reduction in HM excitability. First, Kubin will discuss the co-expression of mRNA for distinct serotonergic and adrenergic receptors and the developmental changes that occur in selected mRNAs and the corresponding receptor proteins in HMs. Second, Bayliss will discuss cellular and ionic mechanisms by which motoneuronal excitability is regulated by H+, neurochemicals (such as 5-HT and norepinephrine) and inhalational anesthetics. He will show that leak K+ channels, with properties of the two-pore-domain, pH-sensitive TASK channels,

represent ion channel targets common to these chemically diverse modulators. Differential modulation of TASK channels provides a mechanism for dynamic regulation of motoneuronal excitability. Third, Berger will discuss the importance of enhanced glycinergic inhibitory synaptic transmission to HMs during rapid eye movement sleep. He will show how 5-HT can reduce such inhibitory activity. He will discuss recent studies showing that ethanol, which is known to exacerbate OSA, can enhance glycinergic inhibitory synaptic transmission. Further, the mechanism of ethanol action on glycine receptor properties will be presented. Finally, Horner will describe his experiments of modulation of neurotransmission in freely behaving rats and show the differential effects of 5-HT in modulating hypoglossal motor outflow and reflex responses across natural sleep-wake states. He will also describe the role of endogenous glycine and GABA in modulating hypoglossal motor outflow and reflex responses across natural sleep-wake states.

Epithelial-Neuronal Interactions Underlying Bladder Gene-Regulation and Sensory Function

APS Physiological Genomics Group

Lori A. Birder

L. A. Birder, M. J. Caterina, R. Saban, N. Bunnett, D. Cockayne

Recent studies support the idea that urothelial cells exhibit specialized sensory and signaling properties that allow them to respond to their environment and communicate with neighboring bladder nerves. These properties include the release of mediators (nitric oxide, NO; ATP) and expression of receptors such as the capsaicin receptor, VR1 as well as a subfamily of VR1 related molecules. Complementary presentations will detail the nerve urothelium communication that relays normal and pathological signals from the bladder. For example, data from targeted P2X1, P2X2 and P2X3 gene-deletion studies in mice confirm a significant role for purinergic transmission in afferent as well as efferent control of urinary reflexes. Activation of P2X3 and/or P2X2 receptors represents a critical step in relaying bladder-filling information to the CNS. In addition, the properties of bladder urothelium and afferents are plastic and can be changed by pathology. Characterization of gene expression profiles has identified a number of genes, which are up regulated in the bladder following inflammation (eg., iNOS, NGF, NFKB and protease activated receptor, [PAR]). Cross talk between genes such as PAR and ion channels can influence afferent excitability and possibly epithelial function. Thus, elucidation of neural-epithelial signaling mechanisms may provide insights into the pathology of visceral dysfunction.

Mitochondrial Regulation of Cell Function

APS Cross Sectional Symposium

Jahar Bhattacharya

M. Brownlee, J. Bhattacharya, P. Schumacker, R. Lewis

Although mitochondria are best known as suppliers of the cell's ATP requirements, there is increasing recognition that mitochondria regulate several aspects of cell function. This regulation is achieved by the ability of mitochondria to both import and export Ca2+ across the inner membrane, a feature that impacts on the cytosolic Ca2+ concentration, as well as to generate diffusible second messengers. The purpose of this symposium is to bring together speakers who can address different aspects of this novel hypothesis. Several kinds of physiological regulation will be considered. In hyperglycemia, mitochondrial overproduction of reactive oxygen species leads to vascular pathology (Brownlee). In capillaries subjected to pressure stress or cytokine infusion, mitochondrial reactive oxygen species induce proinflammatory responses (Bhattacharya). In lung, mitochondria act as oxygen sensors, generating reactive oxygen species that induce hypoxic vasoconstriction (Schumacker). In T cells, mitochondria control Ca2+ channel activity and thereby regulate T cell activation, hence immune function (Lewis). Although there has been a resurgence of interest in mitochondria, recent symposia and meetings have focused largely on the mitochondrial role in cell death. This symposium will bring together new and exciting research that directly addresses the novel and under-investigated issue of mitochondria as regulators of physiological function. The speakers will highlight the general nature of this regulation, pointing to new experimental strategies that may impact future research.

Role of the Transcription Factor, TonEBP/NFAT5, in Osmotic and Immunologic Stress

APS Renal Section

Maurice Burg and Joseph Handler

H. M. Kwon, J. Ferraris, A. Rao, S. N. Ho

TonEBP was cloned as a transcription factor responsible for increased transcription of genes that regulate accumulation of organic osmolytes in response to hypertonicity in renal inner medullary cells. Substantial progress is being made in elucidating the complex osmotic regulation of TonEBP. The identical transcription factor was also cloned by homology to the rel domain of the NFATs that are involved in inflamation. In T cells, in addition to its osmotic regulation, NFAT5 is also involved in immunological responses. This is an area in which rapid advances are being made that reveal exciting diversity in the function of this novel transcription factor.

Glucagon-like Peptide 2: Function and Clinical Application

American Society for Nutritional Sciences and APS Gastrointestinal Section

Douglas Burrin and Kelly Tappenden

H. Dowling, D. Drucker, D. Burrin, K. Tappenden, P. Jeppersen

In the last five years, glucagon-like peptide 2 (GLP-2) has emerged as one of the most intriguing and potent modulators of intestinal growth and function. GLP-2 is a member of a family of glucagon-like peptides that have a variety of impor-

tant biological functions, not only within the gastrointestinal (GI) tract where they are produced, but also in the body as a whole in terms of carbohydrate metabolism and appetite regulation. GLP-2 is a gut peptide that is secreted in response to nutrient ingestion and has trophic and functional actions that are highly specific for the gastrointestinal tract. The biological actions of GLP-2 are mediated by a G-protein linked receptor that is localized to the gastrointestinal tract. However, the precise cellular localization of the GLP-2 receptor and complete identity of down-stream signaling pathways have yet to be established. GLP-2 has been implicated as a key endocrine signal involved in the nutritional regulation of intestinal adaptation under conditions of total parenteral nutrition (TPN) and massive small bowel resection. Treatment of TPN-fed animals with GLP-2 stimulates intestinal growth and prevents mucosal atrophy. Short-chain fatty acids (SCFA) also exert trophic actions under these conditions of intestinal adaptation. Moreover, the trophic effects of SCFA may be mediated indirectly via stimulation of GLP-2 secretion. Growing interest in GLP-2 also has been fueled by the prospect that it may become approved for widespread therapeutic use in treatment of short-bowel syndrome in adults. Recent clinical studies in short-bowel patients indicate that GLP-2 treatment improves clinical outcomes, such as nutrient absorption and weight gain.

Life to Death Decisions and the Fate of Apoptotic Cells

APS Endocrinology & Metabolism Section

John A. Cidlowski
J. Yuan, D. Green, J. Cidlowski, V. Fadok

Cell death, in concert with mitosis and differentiation, is a critical component of a cell life cycle in metazoans. Homeostatic control of cell numbers under both normal and pathological conditions reflects a balance between proliferation and cell death. It is now well appreciated that apoptosis or programmed cell death is the primary counterbalance to mitosis, maintaining the constant approximately 100 trillion cells in adult humans. In addition, apoptosis has now been implicated in over 50 human diseases, ranging from AIDS to heart disease, to stroke. Furthermore, components of the cellular suicide process are now actively being pursued as targets for therapeutic intervention by numbers of pharmaceutical companies. Research in apoptosis has been one of the most actively investigated research areas for the past five years with over 10,000 papers being published yearly.

Building Better Bone: Sex Genes and Drugs

American Federation for Medical Research

Thomas L. Clemens
C. J. Rosen, S. C. Manolagas, D. W. Dempster

Redox Signaling of Angiogenic Response in the Heart

APS Cardiovascular Section

Dipak K. Das and Nilanjana Maulik
N. Maulik, R. J. Tomanek, W. M. Chilian, K. J. Rakusan

Reactive oxygen species (ROS) is implicated in the pathophysiology of a variety of vascular diseases including coronary artery disease, arrhythmias, congestive heart failure, cardiomyopathy, hypertension, atherosclerosis and diabetes. Constitutive cellular protection against oxidative stress is provided by various intracellular antioxidants such as glutathione, α-tocopherol and ascorbic acid and antioxidant enzymes that include superoxide dismutase (SOD), catalase and glutathione peroxidase (GSHPx). There is evidence to support that oxidative stress resulting from increased production of ROS causes a reduction of intracellular antioxidants in the vascular organs. Pretreatment of the hearts with antioxidants or antioxidant enzymes has been found to ameliorate ischemic reperfusion injury by reducing the formation of ROS.

Interestingly enough, the same ROS has been found to stimulate angiogenic response in the ischemic reperfused hearts. For example, following percutaneous transluminal coronary angioplasty (PTCA), angiographic restenosis is frequently observed in the lesions treated with stents. A recent study demonstrated that vessel wall thickening after instent restenosis was accompanied by extensive neovascularization, vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) expression, iron deposits and epitopes characteristic of oxidative stress. This would tend to indicate that ROS causes tissue injury in one hand and promote tissue repair in another hand by promoting angiogenesis. Dichotomy in ROS behavior can be explained in the light of recent findings that ROS can function as signaling molecules. Evidence is rapidly accumulating to indicate that ROS can initiate a cascade of signal transduction process. Nitric oxide (NO) is a typical example—it is a highly reactive radical which functions as a signaling molecule. It has been reported that during myocardial adaptation to ischemia, NO plays a crucial role by initiating a cascade of signal transduction processes. ROS have also been found to function as signaling molecules during myocardial preconditioning against oxidative or hypoxic stress.

Many antioxidants can also function as signaling molecules. One typical example is polyphenolic antioxidants such as proanthocyanidins and resveratrol. These compounds have been found to trigger a survival signal to the cells by reducing proapoptotic factors such as Jnk and c-Jun. It seems likely that anti-angiogenic properties of thiol-containing antioxidants are due to their ability to counteract the angiogenesis process triggered by ROS. It is our hope that the symposium will discuss how redox signaling can regulate the angiogenic response in the heart.

Neuron- Glia Interactions in Nervous System Function

APS Cross Sectional Symposium

Joseph S. Erlichman and Joachim Deitmer
B. Ransom, E. Ullian, R. Swanson, J. Deitmer

The interplay between neurons and glia in the nervous system is more complicated than previously envisioned. Glial cells have been implicated in a pletheora of cellular functions related to neuronal migration/differentiation, metabolic support, synaptogenesis, neurotransmitter regulation, and

extracellular ion homeostasis. Ransom will begin the symposium with opening remarks about the role of glia in nervous system function followed by more focused treatment of the metabolic coupling that occurs between neurons and glia. Recent evidence suggests that astrocytes release substrates such as lactate, alanine and alpha ketoglutarate which can be taken up and consumed by neurons to generate ATP. Ullian will then speak on the critical role glia play in the formation and maintenance of synapses in the brain. CNS synapse number and efficiency can be regulated by a number of soluble factors released by glia suggesting that this cell type may actively participate in synaptic plasticity in the nervous system. Swanson will expand on this topic and discuss the mechanisms that glia can modulate neuronal activity by regulating neurotransmitter accumulation at the synapse. Glia have specific transport mechanisms that sequester both glutamate and GABA from the extracellular space. Recent studies have shown that that there is regulated release of neurotransmitters from glia implicating an important role of glia in chemical synaptic transmission. Deitmer will continue on this theme by describing how glia can modulate neuronal function by altering extracellular ion concentrations, specifically K^+ and H^+. Regulation of these ions may be of particular importance in medullary control of cardiorespiratory function and the development of epileptic foci in the brain.

Recent Advances in the Study of Intestinal Hexose Transport Proteins

APS Gastrointestinal Section
Ronaldo Ferraris
E. Wright, G. Kellett, R. Ferraris, E. Brot-Laroche, C. Cheeseman

The average daily Western diet contains over 300g of carbohydrates, and carbohydrate consumption is expected to increase in the future. In this symposium, we will discuss recent advances and new controversies related not only to the contributions of various intestinal sugar transport systems to the total sugar load delivered to the bloodstream ,but also to the regulation of these transport systems by their substrates. Recent findings indicate that the control of expression of intestinal hexose proteins, both GLUT's (facilitated hexose transporters) and SGLT's (sodium-coupled glucose transporters) is regulated in far more complex ways than previously expected. We will describe recent advances in our understanding of molecular and signaling mechanisms underlying intestinal sugar transport. We begin with recent work that supports the well established roles of SGLT's and GLUT's in the absorption of hexoses, describe the potential contribution of SGLT's in the transport of water across the epithelium, and relate how the appearance of SGLT's and GLUT's are regulated during ontogenetic development. We continue with a new proposal that GLUT2, long considered to be responsible for serosally-directed basolateral sugar transport, may also be involved in the passive absorption of sugars across the apical membrane. We describe the signaling mechanisms regulating the transient appearance of this transporter in the apical pole and how this mechanism may explain gaps in our knowledge of transepithelial hexose transport. Finally, we present new evidence showing that there may be additional GLUTs or unsuspected routes for the exit of hexoses across the basal pole of the epithelium, and suggest future studies that may explain and even unify these various models of intestinal hexose transport.

Microcirculatory Society Young Investigator Symposium

The Microcirculatory Society
Jefferson C. Frisbee and David W. Stepp
D. G. Welsh, D. A. Beard, J. D. Tune, C. Heaps, R. J. Price

The purpose of the "Young Investigator Symposium" is to spotlight outstanding young investigators making the transition from a sponsored position to an independent scientist. Five individuals at this stage have been identified and have been invited to present their novel, independent work to the larger research community. The issues about which these invited presenters will be speaking encompass a wide range of sub-topics in microvascular research, including electrophysiology (Heaps), cell:cell communication (Welsh), vascular reactivity (Tune), angiogenesis/microvascular networks (Price) and quantitative modeling of transport/exchange phenomena (Beard). It is anticipated that providing this opportunity for these young investigators will increase their exposure as the next generation of leading investigators of the microcirculation, and we believe that the quality of speakers and the diversity of topics should allow for a highly stimulating scientific session.

Molecular Regulation of Nitric Oxide Synthase Activity

APS Renal Section
Jeffrey Garvin and Jennifer Pollock
P. Ortiz, J. Sullivan, W. Zhang, D. Bredt

Nitric oxide regulates a number of processes in the kidney including renal blood flow, tubuloglomerular feedback and nephron transport. Numerous renal cell types express nitric oxide synthase (Nos) including tubular segments (Nos 1, 2, 3), the endothelial cells (Nos 3) and the macula densa (Nos 1). As originally described, the activity of constitutive Nos isoforms (Nos 1 and 3) were primarily regulated by changes in intracellular calcium concentrations while that of Nos 2 was primarily regulated by increases in transcription and translation. Advances in the study of Nos isoforms have revealed that our original ideas concerning the control of Nos activities were simplistic. Recently it has been demonstrated that the activities of the three Nos isoforms can be regulated through protein-protein interactions and that activation in many instances requires translocation form one intracellular compartment to another. Furthermore, the protein-protein interactions involving a Nos isoform and regulatory proteins depends on splice variants of the original mRNA. The purpose of this symposium is review the most recent advances in our understanding of how translocation and protein-protein

interactions regulate Nos activity. Activation by calcium will not be discussed.

Frontiers of Intravital Microscopy: Crossroads of Physiology and Pathology

Techniques and Technology Workshop
Michael S Goligorsky and Alan Verkman
W. Webb, J. Fujimoto, R. Weissleder, F. Kajiya

In the recent years, great progress has been achieved through the development and application of several approaches to intravital microscopy. These include optical coherence tomography, near-infrared optical tomography, multi-photon microscopy, as well as generation of novel probes (beacons) to assist in accomplishing high resolution, discrimination, and molecular diagnostics within functioning tissues. The importance of these approaches for renal physiology and kidney disease is obvious, yet the rate of utilization of these technologies in our discipline is disappointingly slow.

Methods to Detect Oxidative and Nitrosative Stress

Techniques & Technology Workshop
Matthew B. Grisham and Joe Granger
M. Tarpey, D. Jones, A. W. Cowley, M. B. Grisham

Peroxisome Proliferator-Activated Receptors (PPARs)

APS Cross Sectional Symposium
Y. Guan and C. Sigmund
Speakers: TBA

Peroxisome proliferator-activated receptors (PPARs) are transcription factors belonging to the nuclear hormone receptor superfamily. PPAR has three isoforms designated PPARα, PPARβ/δ and PPARγ. All three isoforms share similar protein sequence and structure, but they differ in tissue distribution, ligand selectivity and biological actions. As ligand-activated transcription factors, PPARs participate in a broad spectrum of biological processes including cell differentiation, energy balance, lipid metabolism, insulin sensitivity, bone formation, inflammation, and tissue remodeling. PPARα is the molecular target of the hypolipidemic fibrates including benzafibrate and clofibrate. In general, PPARα is expressed in tissues with high mitochondrial and β-oxidation activity corresponding to its role in regulating lipid metabolism. In contrast, PPARβ/δ is ubiquitously expressed and has been suggested to be involved in bone formation, oocyte implantation and lipid catabolism. PPARβ/δ ligands have been found to improve lipid profile and insulin resistance and modulate cell survival. PPARγ is a key player in adipogenesis and plays important roles in diverse cellular processes such as cell cycle regulation, cell differentiation, and insulin sensitivity. Synthetic PPARγ ligands including thiazolidinediones (TZDs) and non-TZD compounds have been shown to increase insulin sensitivity and improve hyperglycemia in insulin resistance and insulin-independent diabetes mellitus (NIDDM). Based on biological effects of PPARs, both agonists and antagonists for PPARs may provide new therapeutic options in a variety of human diseases.

Recently, the kidney has also been shown to differentially express all PPAR isoforms. PPARα is predominantly expressed in proximal tubules and medullary thick ascending limbs, while PPARγ is expressed in medullary collecting ducts, pelvic urothelium, glomerular mesangial cells and renal microvascular endothelial cells. PPARβ is ubiquitously expressed in all nephron segments as well as interstitial cells. Accumulating data has begun to emerge suggesting physiological and pathophysiological roles of PPARs in the kidney. PPARα plays an important role in triggering fatty acid utilization and the adaptive response to dietary lipids in the kidney. PPARγ may not only modulate vascular tone but also be a novel regulator of water and sodium homeostasis possibly accounting for water and sodium retention in patients receiving antidiabetic thiazolidindiones PPARγ ligands. Glomerular PPARγ has been found to participate in mesangial remodeling and might be a therapeutic target for treating glomerulosclerosis and diabetic nephropathy. Although PPARβ is ubiquitously expressed in the kidney, recent data suggest an important role of PPARβ in adaptive role for cells exposed to hyperosmality. Finally, PPARs also participate in lipid metabolism, inflammation, renal cell survival and apoptosis and blood pressure regulation and may be critical contributors in dyslipidemia, hypertension and atherosclerosis secondary to the renal diseases.

The aim of the symposium is to overview the current knowledge relating to PPAR action, ligand binding and tissue distribution. Recent developments regarding the role of PPARs in diabetes, inflammatory disease (atherosclerosis), hypertension, cell proliferation and differentiation and extracellular matrix remodeling with particular relevance to the kidney will be discussed.

Plasticity and Behavior

Association of Latin American Physiological Societies
Rosalinda Guevara Guzmán
Speakers: TBA

Science in the Media

APS Public Affairs Symposium
Andrea Gwosdow
Speakers: TBA

Mapping the genome…hypertension…heart disease—the list of recent news stories written on science-based issues goes on and on. These articles are part of a growing niche in the media for science and health news. Journalists are eager to report on new research in the life sciences. Many reporters have a moderate knowledge of the sciences and some even have subscriptions to scientific journals. They are becoming more receptive to scientific information, especially that which affects human health and personal quality of life. A growing number of reporters have become proactive in their approach, contacting scientists to explore new research on the horizon.

What does this mean to APS members? This ever-growing interest in scientific news is an opportunity to assist in public understanding of and garner public support for scientific and biomedical research. Not only are there many more occasions to publicize scientific studies, but there is also a higher probability that scientists will be called upon by the media to explain these studies. Helping APS membership to take advantage of these opportunities is the aim of the Communications Symposium at EB 2003.

The symposium, entitled "Science in the Media," will feature a panel of three journalists (from TV, newspaper and radio) giving their insight into what makes science news and contributing best practices for getting your research covered. The symposium will also feature a hands-on session, with medical publicist Donna Krupa, discussing how scientists can work with the media. This will take the form of a mini-workshop where participants can engage in practical exercises.

The goal of this symposium is to familiarize scientists with how the media works. By preparing scientists to sculpt clear, media-ready messages, the scientific community assists in bringing accurate information to the public. The symposium is open to all members and will be held on Friday, April 11, 2003 from 2-4 PM in San Diego, CA.

Physiology in Medicine: Renal and Cardiovascular Pathophysiology

APS Translational Research Group

John E. Hall and Dale J. Benos

P. Libby, S. S. Gambhir, F. Luft, K. Griendling

The APS, as part of its strategic planning activities, has embarked upon a translational physiology initiative. The APS defines translational research as "the transfer of knowledge gained from basic research to new and improved methods of preventing, diagnosing, and treating disease, as well as the transfer of clinical insights into hypothesis that can be tested and validated in the basic research laboratory." This definition explicitly states that translational research occurs in both directions, from the bench to the bedside and vice versa. To this end, we designed a symposium to highlight translational physiology in the general area of renal and cardiovascular disease. The symposium will examine specific issues within the topic area covered, and to facilitate a continuing dialogue between basic and clinical scientists. This Societal effort is a continuation of on-going efforts to publish translational research in all of the Society's research Journals, as well as in the *Physiology in Medicine* (PIM) series, published in *Annals of Internal Medicine*.

Libby will speak first. He will review the role of hypertension and inflammation in the process of atherosclerosis. The second speaker, Gambhir is a leading scientist in the field of molecular imaging, including gene expression. Gambhir will present the therapeutic/diagnostic values of molecular imaging in cardiovascular disease. The third speaker, Luft, will integrate mechanisms of diabetic and hypertension-induced nephropathy—the two main causes of end-stage renal disease. Lastly, Griendling, will discuss the clinically relevant topic of oxidative stress in cardiovascular disease. Speakers will emphasize the ways in which they developed their interdisciplinary research teams, and share their thoughts and experiences in this regard. They will not discuss details of these research topics, but rather highlight the "bridging" aspects necessary for successful translational research. They are all excellent speakers and their presentations will engender much interest.

The Biology of Differentiated Thyroid Cancer: A Bench to Bedside Review

American Federation for Medical Research

Bryan R. Haugen

J. Fagin, T. G. Kroll, S. Jhiang, B. R. Haugen

Muscle Physiology: From Cellular to Integrative

APS Education Committee Refresher Course

Robert L. Hester and George A. Ordway

C. R. Webb, S. Brooks, D. Korzick, R. Richardson

Muscle physiology is an important component in the teaching of a number of organ systems and of the integration of these systems in response to environmental stresses. Purposeful movement, as well as normal cardiovascular, respiratory, and gastrointestinal function all depend on intact, healthy muscles. This unique refresher course will present up-to-date concepts in muscle physiology. The material will cover smooth, skeletal, and cardiac muscle, followed by an integration of these systems in the context of the physiological response to exercise.

Physiology InFocus-Physiological Implications of Oxidative and Nitrosative Stress

Barbara A. Horwitz

Session I: General Overview and Physiological Relevance
Session II: Emerging Concepts in Oxidative and Nitrosative Signaling
Session III: Oxidative Stress: Cardiovascular Consequences
Session IV: Oxidative Stress: Pulmonary Consequence

Genomics of Angiogenesis and the Microcirculation

APS Physiological Genomics Group

Jay B Hoying

J. B. Hoying, J. D. Coffin, W. M. Pardridge, S. J. Childs

Considerable effort is being directed at understanding the complexities of the cardiovascular system. Many diseases involving the heart and vasculature are considered to have a polygenic etiology. Furthermore, it is thought that gene polymorphisms and varied gene expression levels explain a significant amount of the observed phenotypic variation and disease predisposition. Genomic-based research is providing the foundation to understand the molecular complexities of a number of vascular-related diseases including atherosclerosis and hypertension. Similarly, genomic and genetic approaches are being applied to the microvasculature in an effort to discern the molecular features of this dynamic sec-

tion of the vasculature. Researchers are identifying new classes of genes and additional levels of molecular interplay in the areas of microvascular patterning and tissue vascularization. This session is intended to highlight these research efforts and provide a forum for continued discussion

Caveolar Domains in Cell Signalling

APS Cell & Molecular Physiology Section

Paul A. Insel

M. Lisanti, J. Schnitzer, S. Steinberg, R. S. Ostrom

There is a wealth of recent information that indicates that microdomains of the membrane, in particular caveolar microdomains, function as signalling organizing centers to regulate formation of key second messengers and their actions on enzymes and channels. Caveolins, proteins found in caveolae, seem to function as both scaffolding molecules and as regulators of enzymes involved in generation or action of second messengers. Speakers in this symposium will review some of the recent ideas that implicate such a central role for caveolae in signal transduction and cell regulation.

Thin Filament Regulation of Muscle Contraction

APS Muscle Biology Group

J.-P. Jin

T. Nosek, J. Trewhella, J-P Jin, S. S. Lehrer, K. Morgan

Muscle contraction is regulated by Ca2+. This session will focus on the structure and function of the thin filament regulatory system in muscle. The discussion of striated muscle regulation will focus on skeletal muscle. The potential role of smooth muscle thin filament regulation will also be discussed. Striated muscle contraction is primarily regulated through the actin thin filament based troponintropomyosin system. Skeletal muscle contraction represents the basic mechanism of striated muscle function. The current model for skeletal muscle contraction proposes that excitation signal from a motor neuron induces depolarization of the plasma membrane of the muscle fiber at the neuromuscular junction. The resulting change in membrane potential triggers a rise of cytoplasmic [Ca2+]. Contraction is initiated by the binding of Ca2+ to troponin C (TnC, the Ca2+-binding subunit of troponin) and induces a series of allosteric changes in TnC, troponin I (TnI, the inhibitory subunit of troponin), TnT (the tropomyosin-binding subunit of troponin) and tropomyosin. These conformational changes in the thin filament allow the myosin head to form a strong crossbridge with F-actin. This activates the myosin ATPase and forces the thin filaments to slide relative to the thick filaments and shorten the sarcomere. Troponin and tropomyosin play central roles in this Ca2+-signaling mechanism. Therefore, their gene regulation, structure and interactions are critical to the function of muscle. A better understanding in this area will lead the studies of physiological adaptation of muscle and pathogenesis of myopathies. In smooth muscle, the primary regulation of contraction is through Ca2+-calmodulin-dependent phosphorylation of myosin light chain, which activates the actomyosin Mg-ATPase. However, during sustained contractions of tonic smooth muscle, force is maintained while [Ca2+] and myosin phosphorylation are reduced.

Therefore, it has been that additional regulatory mechanisms may exist at the level of the thin filament. For example, caldesmon and calponin inhibits the actin-activated Mg-ATPase activity of phosphorylated smooth muscle myosin and the inhibition is regulated by phosphorylation-dephosphorylation. The physiological role of the smooth muscle thin filament regulation has been a focus of debate and deserves further discussion.

The Drug Discovery Process: Opportunities for Physiologists

APS Careers in Physiology Committee

John H. "Wick" Johnson and James M. Norton

J. H. Johnson, D. M. Pollock, T. J. Opgenorth

The purpose of this symposium is to expose young physiologists to new career opportunities, to educate others about the important work of the physiologist in drug discovery, and to demonstrate how academic collaboration with industry leads to new drug discoveries. The program will lead the audience through the drug discovery process from discovery of the initial drug target, to the role of the academic scientist, to the development of candidate drugs that have efficacy in a disease model, to preclinical safety, pharmacokinetics, pharmacodynamics, to various phases of clinical trials all the way to getting the new drug on the market. Each speaker will highlight the unique career opportunities at all levels for trained physiologists.

The Function and Regulation of Mitochondrially Produced Nitric Oxide in Cardiomyocytes

APS Cardiovascular Section

Anthony J. Kanai and James Peterson

C. Richter, C. Giulivi, V. Darley-Usmar, D. Stuehr

Recent findings from a number of laboratories have demonstrated the presence of a constitutive nitric oxide synthase (NOS) in mammalian mitochondria (mtNOS) from brain, liver, kidney, skeletal and cardiac muscle. This was accomplished using cellular, organelle and enzyme preparations of mtNOS and a number of different NOS detection techniques. Furthermore, in cardiac myocytes, mtNOS has been identified as the α-splice variant of neuronal nitric oxide synthase (nNOSα). This was deduced by the direct microsensor measurement of nitric oxide (NO) production, which was absent in cardiac mitochondria isolated from the hearts of nNOSα, but not eNOS or iNOS knockout mice. However, while the existence of mtNOS is now established, the function(s) of mitochondrially produced NO remain(s) controversial.

NO at nonphysiological millimolar concentrations has been known for many years to bind to cytochrome *c* oxidase, the terminal enzyme in the mitochondrial electron-transport chain. However, the more recent finding that physiological nanomolar concentrations of NO inhibit cytochrome *c* oxi-

dase transiently and competitively with molecular oxygen indicates a potential physiological role for NO in the control of cell respiration, ATP synthesis and myocardial contractility. It is presently unclear whether the 10-20 nanomolar NO produced by mtNOS is adequate to inhibit cytochrome *c* oxidase significantly, or whether the 200-400 nanomolar NO produced in the cytosol or by the vascular endothelial cells is required. In addition, NO might also augment the generation of reactive oxygen species produced by the mitochondria and thereby trigger events leading to apoptosis. For example, complexes I and III of the mitochondrial respiratory chain are thought to be the principal sites of superoxide (O_2^-) generation in the cell. Typically, O_2^- is dismutated to hydrogen peroxide (H_2O_2) by manganese superoxide dismutase (MnSOD or SOD2) in the mitochondria. However, NO has been shown to react with O_2^- to form peroxynitrite (ONO_2^-), a strong oxidant that is thought to be responsible for the pathological actions of NO via protein nitration. It has also been suggested that cytochrome *c* oxidase possesses peroxynitrite reductase capabilities which may help clear this strong oxidant from the mitochondrion.

Accordingly, in this symposium, we will discuss the characterization and biochemistry of mtNOS. The nitric oxide cytochrome c oxidase signaling pathway, its mechanism and biological implications. We will also discuss the mechanism and consequences of protein nitration in mitochondria and the possible consequences of MnSOD dysfunction for the cell.

NHLBI Program for Genomic Applications: Background for Physiologists

NIH, APS, ASBMB

Anne E. Kwitek Black
S. Old, W. Skarnes, H. J. Jacob, D. Nickerson, J. Quackenbush, J-F Chen

A major focus in health care in the new millennium will be to link genomic information to pathophysiology. The National Heart, Lung, Blood Institute (NHLBI) has pioneered a Program for Genomic Applications (PGA) (http://www.nhlbi.nih.gov/resources/pga/), a major initiative to advance functional genomic research related to heart, lung, blood, and sleep health and disorder. The program, consisting of 11 PGAs, will develop information, tools, and resources to link genes to biological function on a genomic scale. All the information, reagents, and tools developed in the PGAs will be freely available in a timely manner to the research community. This workshop, a follow up to an ASBMB supported PGA seminar (immediately prior), would provide the scientific community working in heart, lung, blood, and sleep disorders, how to utilize the resources developed by the PGAs, including animal models, DNA variations (SNPs), Gene Expression (Microarrays), and Bioinformatics.

Novel $Ca2^+$ Signaling Mechanisms in Vascular Myocytes: Cyclic ADP-Ribose, Ryanodine Receptors and $Ca2^+$-induced $Ca2^+$ Release

APS Cardiovascular Section

Pin-Lan Li and Cornelis Van Breemen
L. H. Cheung, M. T. Nelson, P-L Li, G. A Meininger, C. Van Breemen

Recent studies have indicated that a novel $Ca2^+$ signaling pathway mediated by cyclic ADP-ribose (cADPR) and ryanodine receptors (RyR) plays an important role in the regulation of vascular tone. It has been demonstrated that this pathway is involved in generating $Ca2^+$ sparks, waves and oscillations in cells, as well as in modulating $Ca2^+$-induced $Ca2^+$ release (CICR) and spontaneous transient outward currents (STOCs). It has recently been implicated in regulating vasomotor response to various agonists.

Despite intensive investigations regarding the actions of cADPR/RyR signaling in a wide variety of cell systems spanning three biological kingdoms; protist, plant and animal, its importance has not yet been widely recognized in the field of vascular physiology and pharmacology. The symposium will focus on the fundamental roles of this signaling pathway in regulating vascular tone and in mediating vasomotion in response to various agonists. We feel that it is important to promote discussions and exchange ideas between scientists with interests in the basic mechanisms of this novel signaling pathway and those with interests in vascular physiology and pharmacology. The cross-fertilization of ideas will greatly advance our understanding of the physiological and pharmacological relevance of this new $Ca2^+$ signaling pathway.

Presentation Skills

APS Women in Physiology and ASPET Women in Pharmacology Committees

Carole M. Liedtke, Siribhinya Benyajati, Joan Lakoski
M. Hendrix, J. Lakoski, A. Schreihofer, K. Barrett

One of the charges to the Women in Physiology Committee is to distribute information to young scientists regarding strategies for a successful career in science. Another is to coordinate activities with other such groups within FASEB. The APS Women in Physiology Committee is pleased to jointly sponsor a workshop on "Presentation Skills" with the ASPET Women in Pharmacology Committee. APS co-chairs Liedtke and Benyajati will coordinate planning with ASPET representative Lakoski. The format of the workshop is to present four topics in 15 minute talks followed by a breakout session. Topics include elements of good presentations, how to share science with the public and media, and interviewing skills. Panelists will include, but not be limited to, APS and ASPET women in an effort to promote awareness of women who are successful scientists/role models. Tentative panelists include Lakoski, Hendrix and Barrett. After the talks, a breakout session is planned to promote active participation of the audience and young scientists in best practices for each topic. The target audience is young scientists of both genders interested in learning skills for their future careers. The workshop also offers a venue for networking between junior and senior scientists.

Everything Old is New Again: Thyroid Hormone and the Failing Heart

American Federation for Medical Research

Carlin S. Long
M. Bristow, C. S. Long, S. Goldman, W. Dillmann, M. Eghbali-Webb

Although once used for patients with cardiac dysfunction, thyroid supplementation was dismissed as a viable therapeutic approach for these patients as newer pharmaceuticals became available and the untoward side-effects (tachycardia and increased myocardial oxygen consumption) became problematic. A possible role for thyroid hormone receptor therapy in patients with heart failure has undergone a recent renaissance as both basic science and clinical data have supported a possible connection between thyroid receptor isoform expression and the failing heart as well as the availability of analogs with both receptor specificity and limited myocardial side-effects. This symposium will review both the recent basic science and clinical advances that would support a role for modulation of the thyroid hormone receptor axis as a viable alternative (or supplement) to presently available therapies.

Subcellular Organization of Second Messenger Signaling in Cells of the Cardiovascular System

APS Cardiovascular Section

Ron Lynch
R. Paul, S. Jaken, S. Steinberg, E. Moore, M. Blaustein, D. Cooper

Over the last decade it has become appreciated that signaling cascades are organized within cells, and this organization confers advantages with respect to specificity in activation of cellular functions. This symposium would survey current work using a variety of techniques to investigate signaling pathways and their organization in cardiac and vascular cells. The topics will range from the organization of syub-membrane calcium stores and signaling to the dynamic regulation of protein kinase and G-protein interactions for localizing signaling events. This symposium would likely draw individuals from a range of areas due to the general implications of the work.

Caveolin Regulation of Endothelial Function

APS Respiration Section

Richard D. Minshall and Asrar B. Malik
W. Sessa, R. Minshall, R. Stan, R. Anderson

There has recently been much interest in the function of caveolae driven by the findings that caveolae concentrate a variety of signaling molecules. Some of the interest has been sparked by the recent findings observed in caveolin-/- mice. Caveolin-1 oligomerization and insertion in the cytoplasmic face of the plasma membrane not only serves as a scaffold and "master" regulator of signaling molecules, but also forms the ridges around the caveolae that enable invagination of the membrane into the flask-shaped caveolae structure. In this Symposium, the focus will be on the regulation of endothelial function by caveolin-1 from four perspectives: intra-cellular Ca2+ regulation, control of NO production, role in endocytosis, and signaling of cell proliferation. *1*) Anderson, a pioneer in the caveolin-1 field, will describe the regulation of Ca2+ signaling and Ca2+ entry by caveolin-1. As Ca2+ influx channels and pumps appear to be concentrated in caveolae, caveolin-1 may be key in regulating intracellular Ca2+ signaling in endothelial cells. *2*) Sessa will outline how caveolin-1 regulates nitric oxide signaling. In his model, endothelial nitric oxide synthase is held in an inactive conformation by the caveolin-1 scaffolding domain. An increase in cytosolic Ca2+ or activation of the kinase Akt can activate eNOS and lead to its dissociation from caveolin-1. *3*) Minshall will address his findings on the regulation of *Src* kinase signaling and dynamin activation by caveolin-1. In this context, tyrosine phosphorylation of caveolin-1 is a key "switch" regulating caveolae-mediated endocytosis and transcytosis of macromolecules in the endothelial barrier. *4*) Finally, the phenotype of the caveolin-1 knockout mouse lung and endothelial barrier will be described by Stan. The fibrotic lung observed in this model may be the result of an uncontrolled endothelial cell proliferative response that will be discussed in the context of the signaling mechanisms regulated by caveolin-1. Together, this Symposium would foster a better understanding of how caveolin regulates endothelial cell signaling and function.

Redox Regulation of Renal Function and Arterial Pressure

APS Water & Electrolyte Homeostasis Section

R. Davis Manning, Jr. and Ai-Ping Zou
C. S. Wilcox, A-P Zou, J. L. Garvin, R. D. Manning

Recent studies have indicated that physiological concentrations of reactive oxygen species (ROS) play an important role in the normal regulation of cell and organ function. Redox-mediated signaling is emerging as a fundamental regulatory mechanism in cell biology and physiology. In this regard, ROS have been reported to participate in the control of vascular tone, and the interaction of superoxide (O2-.) and nitric oxide (NO) has been considered as one of the important mechanisms regulating cardiovascular function. It has been demonstrated that O2- inactivates the endothelium-dependent relaxing factor (EDRF), thereby reducing the arteriolar dilation to acetylcholine or other endothelium-dependent vasodilators. The production or scavenging of O2- may profoundly alter the levels and activity of NO in the vascular wall. This interaction of NO and O2- is of importance in the regulation of endothelial function and thereby in the control of vascular tone.

Despite intensive investigations of the physiological role of ROS in the control of vascular functions, the redox regulation of renal function remains poorly understood. Since more and more physiologists and other scientists are interested in this topic and many studies have been published in this area more recently, we feel now it is very timely to organize a symposium to present some new information and ideas about redox regulation of renal function and arterial pressure. Importantly, this symposium will mainly focus on physiology

of ROS, rather than its pathological effects in the kidney, which will bring those scientists who are interested in basic function of ROS, together for discussion and exchange of ideas. We believe this symposium will largely increase our understanding of this new physiological mechanism regulating renal function or water and electrolyte homeostasis.

Regulation of Ion Channel Structure and Function by Reactive Oxygen Nitrogen Intermediates

APS Respiration Section

Sadis Matalon and Douglas C. Eaton
S. Matalon, J. Stamler, M. Kotlikoff, D. Eaton

Ion channels are one of the major mechanisms for transducing external signals across the cell membrane to the cell interior. Therefore, intracellular signaling mechanisms that control the activity of ion channels are extremely important to normal cellular function and cellular homeostasis. Because of the importance of ion channels, many traditional cellular signaling mechanisms modulate ion channel function; however, role of reactive oxygen and nitrogen species have only recently been recognized for their role in altering ion channel activity. Ion channel modulation by reactive species can occur in several different ways. The simplest is through direct post-translational modification of the channel protein. Nitrosylation, nitration and oxidation of key amino acid residues are good examples of such a modification. Alternatively, reactive species can alter the activity of existing signaling mechanism that subsequently lead to changes in channel activity or channel gene expression. An example of this is the activation of the MAP kinase pathways by reactive oxygen species or the G kinase pathway by NO. Finally, there are other more complicated mechanisms mediated by reactive species that alter trafficking or turnover of channel proteins as typified by oxygen radical activation of NF-kB with subsequent changes in proteasomal degradation of channel degradation. Regardless of the mechanism, as will be discussed in this symposium, changes in the cellular level of reactive oxygen and nitrogen species can have profound effects on the activity of ion channels and cellular function. The four speakers will discuss their most recent findings concerning the effects of reactive oxygen nitrogen intermediates on calcium, potassium, sodium and chloride channels. This symposium will have wide appeal to a diverse audience.

The Pons: A Critical Component in Respiratory Control

APS Respiration Section

Donald R. McCrimmon
N. Chamberlin, M. Dutschmann, W. M. St. John, R. Lydic

Evidence is substantial that pontine mechanisms play a fundamental role in the neurogenesis, control and modulation of eupneic ventilatory activity. From the day of birth, perturbations of pontile regions significantly alter the eupneic pattern. Moreover, pontine mechanisms have been implicated in the state-dependent control of breathing, as well as in the reflex protection of the airways. Nevertheless, the pontine roles in respiratory control are much less understood than those of the more accessible circuits in the medulla and spinal cord. The symposium will bring together participants who are internationally recognized for their expertise in differing aspects of pontine influences on respiratory control. McCrimmon will act as chair of the symposium and provide a brief introductory synthesis of the anatomy and proposed roles of the pons in respiratory control. As the first speaker, Chamberlin will lay out the anatomical foundations for interactions between parabrachial and Kolliker-Fuse nuclei in the dorsolateral pons with medullary cardiorespiratory regions. She will also introduce the inter-trigeminal region as an area with site-specific influences on respiratory motor output that may participate in airway defensive behaviors. Dutschmann will continue the discussion of the role of parabrachial and Kolliker-Fuse nuclei of the rostral dorsolateral pons with a consideration of the postnatal development of pontine structure and function. He will do this in a context of continuing the discussion of the pontine role in upper airway reflexes, including roles in the trigeminal (diving) and Breuer-Hering reflexes. St. John will develop the topic of respiratory-related rhythmic neuronal activity in the pons and the provocative concept that following removal of the medulla, the pontine circuitry is itself sufficient for generation of rhythmic respiratory activity. Finally, Ralph Lydic will conclude the discussion with a consideration of the pontine role in state-dependent changes in breathing and upper airway motor tone. He will present new work showing that significant changes in breathing and decreases in upper airway motor tone can be evoked from regions of the pontine reticular formation that modulate arousal but contain no respiratory neurons. In summary, a broad discussion is planned on the pons as a critical and relatively unexplored component of the brainstem ventilatory control system.

Mechanisms of Microvascular Dysfunction in Diabetes

The Microcircuatory Society

Paul F. McDonagh
L. S. Ritter, H. G. Bohlen, G. L. King, J. E. Tooke

Diabetes is increasing worldwide at an alarming rate. There are many serious complications associated with this disease. Many, including ischemic heart disease, stroke, peripheral vascular disease, renal failure and retinopathy, are related to microvascular dysfunction. Despite the importance of gaining a clear understanding of the pathobiology underlying the microvascular changes that occur in diabetes, the mechanisms are not clear. The aims of this symposium are to present the functional alterations that occur in the diabetic microcirculation and what is known about the mechanisms underlying these dysfunctions. Molecular, cellular, integrative and clinical perspectives of the diabetic microcirculation will be presented. Ritter will present an overview of microvascular failure in diabetes with attention to blood-blood vessel interactions under ischemic conditions in the coronary and cerebral microcirculations. Bohlen's presentation will emphasize the effects of hyperglycemia and diabetes on endothelial cell function and microvascular blood flow. King will present alterations that occur in kinase sig-

naling pathways, particularly PKC in diabetic microvessels. Tooke will discuss microvascular dysfunction in human diabetes and pre-diabetes, drawing on recent findings regarding microvascular hemodynamics in insulin resistant states. This symposium will be of interest to experimental biologists, translational researchers and clinicians with an interest in the cardiovascular complications of diabetes.

The Teacher as Educational Researcher

APS Teaching of Physiology Section

Joel Michael and Dee Silverthorn

J. Michael, D. Silverthorn, M. Svinicki, P. Hansen

For the teacher of physiology, the classroom offers a venue for research just as does the laboratory. Whether the questions being asked are purely local (what's happening in my classroom) or more general (how can students be helped to learn this difficult concept better). There are a variety of approaches to educational research that can be pursued and a variety of kinds of data that can be generated. In this symposium we will discuss some of the issues that must be confronted once one decides to do educational research and we will offer some ideas about how to get started in this endeavor. The importance of this form of scholarly activity to the individual, to physiology, and to the broader field of science education will be discussed.

Oxidative Stress, Antioxidant Supplementation and Diabetes

American Federation for Medical Research

Emmanuel C. Opara

K. Haskins, E. C. Opara, I. Jialal, P. A. Low

Oxidative stress is defined as excessive production of reactive oxygen species (ROS) in the face of diminished antioxidant substances. It has been shown that oxidative stress, which increases with age, has an adverse effect on glucose metabolism, and is implicated in the etiology of both Type 1 and Type 2 diabetes. The development of disabling chronic complications of diabetes has also been attributed to oxidative stress. The body's defense against oxidative stress is accomplished by interconnecting systems of antioxidant micronutrients (vitamins and trace elements) and enzymes. While the vitamins act as acceptors and donors of ROS, the trace elements regulate the activities of the enzymes. Although anecdotal reports indicate that the use of certain antioxidant micronutrient supplements may be beneficial as adjunct therapy in the management of diabetes and its complications, there is scarcity of data from well designed and controlled studies to support the empirical observations.

The purpose of this symposium is to review the role of oxidative stress in the pathogenesis of Type 1 and Type 2 diabetes, and in the development of major diabetic complications. In addition, the role of antioxidant supplementation as adjunct therapy in the management of diabetes and its complications will be highlighted. Given the increasing prevalence of diabetes, and the disproportionate health-care expenditures on the disease in the US, as in other countries, there is an urgent need to explore different therapeutic strategies to manage diabetes and its debilitating complications.

Understanding Protein Unfolded States: Implications for Folding, Function, Evolution and Disease

Biomedical Engineering Society

Rohit V. Pappu

K. W. Plaxco, A. K. Dunker, J. W. Kelly, V. S. Pande, J. Hoh

Functional Proteomics: Applications to The Cardiovascular System

APS Cardiovascular Section

Peipei Ping

M. Dunn, I. Benjamin, J. Loscalzo, B. C. Berk, J. L. Unthank

The rapid development of proteomic technologies has recently enabled large pharmaceutical companies to inventory cellular proteins at an unprecedented rate. However, the tremendous amount of novel information obtained from such large-scale proteomic analyses awaits dissection and investigation. Functional proteomics aims to assemble and integrate proteomic information in order to understand the functional role of proteins in normal or diseased organs. This ability to characterize the intimate link between a cellular proteome and the genesis of a physiological/pathological phenotype presents the physiologist with new challenges and opportunities.

Transgenic Models of Heart Failure and Heart Failure Therapeutics

APS Cardiovascular Section and American Society for Pharmacology and Experimental Therapeutics

J. David Port and Joan Heller Brown

T. A. McKinsey, G. Dorn, L. Leinwand, W. Koch

During the past few years, there has been an explosion in the number of transgenic models of heart failure. Any number of proteins, either under expressed (knock out) or overexpressed, either wild type or mutant, have resulted in an apparent phenotypic endpoint of decompensated heart failure. Further, over or under expression of genes from a very diverse spectrum of classes can result in a highly similar pathophysiological endpoint. For example, over expression of several GPCRs, G-proteins, kinases, transcription factors, dominant negative kinases or transcription factors, as well as a number of sarcomeric or sarcomeric associated proteins, can all result in varying degrees of hypertrophy with or without progression too failure. This begs the question, which if any of these models recapitulates "real" causes of heart failure. Recently, several transgenic approaches, as well as gene therapy approaches, have shed light on possible gene targets that may "rescue" or attenuate the progression of the heart failure phenotype. Examples of these are overexpression of βARKct and a phospholamban knockout. In each case, there is a hyperdynamic phenotype that when genetically crossed, "rescues" (selected) specific heart failure models without

themselves promoting any detectable adverse side effects. The purpose of this symposium is to review certain genetic models of heart failure and to attempt to discern what "real" heart failure and what is not. Further, we hope to demonstrate how these models can be used to rescue heart failure with genetic approaches and contrast this to the traditional pharmacological approach. The hope is to translate these findings into a greater understanding of the molecular basis of heart failure and to identify, using genetic approaches, novel targets for the treatment of heart failure.

Functional Genomics and Proteomics of Hypoxia

APS Hypoxia Group
Nanduri R. Prabhakar and Jon Klein
K. Seta, J. Baker, J. Klein, G. K. Kumar

An adequate supply of molecular oxygen is essential for the survival of mammalian cells. A decrease in oxygen availability i.e., hypoxia has serious physiological consequences. Physiological responses to acute hypoxia are rapid in onset and involve reflexes arising from arterial chemoreceptors. Whereas the responses to chronic hypoxia such as that occurs in many patho and physiological situations are delayed in onset and involves alterations in gene expression and protein function. With advent of new techniques for the analysis gene expression and protein function it is being increasingly appreciated that hypoxia not only affects multiple genes but more importantly alters the function of existing proteins. Furthermore, genomic analysis revealed that within a given species hypoxic responses vary among strains. This symposium focuses on recent advances in understanding the functional genomic and proteomic consequences of hypoxia. The presentation by Seta focuses on application of microchip analysis for studying gene expression by hypoxia. Baker's presentation deals with functional genomic analysis of strain differences in the hypoxic response in rats. Unlike chronic sustained hypoxia, intermittent hypoxia leads to serious cardiovascular disturbances. The presentations by Klein and Kumar deal with how alterations in the expression and function of various proteins by intermittent hypoxia impact on physiological functions.

The Chronobiological Environment of Mammals

APS Environmental & Exercise Physiology Section
Roberto Refinetti
R. Refinetti, R. Mistlberger, A. Loudon, A. Rosenwasser

This symposium will highlight aspects of the chronobiological environment of mammals by examining comparative aspects of the influence of circadian rhythms on major physiological processes, particularly thermoregulation, sleep, reproduction, and feeding. The study of circadian rhythms has been one of the fastest growing fields in physiology during the last 20 years. An explosion of knowledge on molecular aspects of circadian rhythmicity has taken place in the last five years. The usefulness of knowledge about molecular mechanisms is tied to the understanding of gene expression and its specific role in the operation of physiological systems. Greater understanding of circadian modulation of physiological processes at the systems and whole-organism level in various species is necessary for a full integration of the growing knowledge on molecular mechanisms. The goal of this symposium is to bring together researchers who have been investigating the circadian modulation of physiological processes in mammalian organisms at the systems/whole-organism level and, by so doing, to facilitate the unveiling of general principles of circadian organization that control the operation of various physiological systems in various species.

Understanding and Applying Critical Translational Assays

APS Liaison with Industry Committee
Glenn Reinhart and Chahrzad Montrose-Rafizadeh
Speakers: TBA

Gap-Junctional Hemichannels: Physiology And Pathophysiology

APS Cell & Molecular Physiology Section
Luis Reuss and Lisa Ebihara
L. Reuss, L. Ebihara, J. C. Saez, J. Weiss, L. Vergara

Gap-junctional hemichannels (GJH) are formed when a connexon (connexin hexamer) inserted in the plasma membrane does not dock with another one in a neighboring cell. The unapposed connexon is a potential conductive pathway between the cell interior and the extracellular fluid. Under normal conditions hemichannels would be closed, largely because of the blocking effect of extracellular divalent cations, but in some instances also because of the membrane voltage and/or the level of phosphorylation of the connexin molecules. The "opening" of GJH threatens survival of the cell because these channels have high conductance to ions, with rather low selectivity, and are also permeable to hydrophilic solutes of Mr up to 1,000 Da. Thus, their activation causes dissipative plasma-membrane fluxes (e.g., uptake of Na+ and Ca2+, loss of K+ and ATP) that may not be compensated by the pre-existing membrane transport mechanism. Effects may be membrane depolarization, colloid-osmotic swelling, ATP depletion and increase in intracellular [Ca2+], which eventually may conduce to cell death. One of the main issues in this symposium will be that ATP depletion (e.g., produced by ischemia) can activate GJH, which in turn cause or accentuate cell damage and thus act as "death channels." This, we propose, may be an important mechanism in brain, heart and kidney ischemic injury. The existence of GJH has been clearly demonstrated by their heterologous expression, but their very existence and possible role in native systems remains controversial. This symposium focuses on the arguments for the existence and pathophysiological role of GJH. Ebihara will discuss the properties of these channels in heterologous expression systems and the mechanisms of regulation of their permeability. Then Saez, Weiss and Vergara will present evidence for the existence of functional GJH in brain astrocytes, cardiomyocytes and renal epithelial cells subjected to "chemical ischemia," respectively. The brain, heart and kidney are the main

organs in which connexin 43 (Cx43) is expressed. The three talks are expected to update the progress in this field in the last few years and should paint a consistent picture that assigns to GJH the potential role of death channels.

Magnetic Resonance: Unique Non-Invasive Insights into the Physiology of Exercise

APS Environmental & Exercise Physiology Section
Russ Richardson and Mark Olfert
R. S. Richardson, K. E. Conley, L. Frank, R. A. Meyer

Magnetic resonance imaging (MRI) and spectroscopy (MRS) are both powerful methodologies offering the unique opportunity to non-invasively investigate both human biochemistry, human physiology and ultimately contribute significantly to the field of medicine. There has been much effort devoted to fostering the evolution of these methodologies into distinct and applicable techniques. Here we will highlight the physiological insight provided by several MRI and MRS techniques to better understand exercise related biochemistry and physiology. Specifically, the use of: *1*) 1H MRS of myoglobin to assess intracellular PO2, *2*) 31P assessment of muscle bioenergetics, *3*) arterial spin labeling of muscle perfusion, and *4*) functional MRI of muscle. This symposium will offer the audience a detailed sojourn into the non invasive world of MRS and MRI research, highlighting current discoveries as they pertain to the physiology of exercise.

The Renin-Angiotensin System and Development

APS Endocrinology & Metabolism Section
James C. Rose and Charles Rosenfeld
C. Rosenfeld, E. Lumbers, R. A. Gomez, L. Woods

The symposium will focus on the renin-angiotensin system during development and will include presentations on the postnatal consequences of alterations in this system occurring prenatally. This approach will ensure that aspects of development will be related to adult physiology and pathophysiology. The topics that the speakers will cover span a broad spectrum under the overall theme of the symposium. The organization would be that the initial speakers would deal with ontogeny including aspects related to the regulation of gene expression and functional genomics of the components of the system. Subsequently, hormonal influences on the functional development of the renin-angiotensin system would be discussed. Here there would be an obvious link to the potential for translating research in the area. This would be followed by the importance of the renin-angiotensin system in the development of the kidney which would encompass both regulation of gene expression and translational research related to renal development. The last speaker would then address the general issue of prenatal influences on the renin-angiotensin system and their postnatal consequences on kidney function and blood pressure regulation with emphasis on the genesis of hypertension. This would provide a continuum linking the renin-angiotensin system with kidney development and with adult pathophysiology.

Flow/Stretch-Regulated Membrane and Ion Transport in Epithelia

APS Epithelial Transport Group
Lisa Satlin and Gerard Apodaca
M. Welsh, S. Weinbaum, L. Satlin, E. Schwiebert, G. Apodaca

Epithelial cells, which cover surfaces, line tubes, or form glands are exposed to various mechanical stimuli including osmotic or hydrostatic pressure, shear stress, and compression. Epithelial cells respond to these stimuli by modifying their rate of division, death, differentiation, movement, signal transduction, gene expression, secretion, and endocytosis. For example, in the cortical collecting duct of the kidney, flow-dependent changes in sheer stress and hydrostatic pressure are accompanied by changes in ion transport. The nature of the mechanical forces involved in these processes and the specific ion channels involved will be discussed by Satlin and Weinbaum. Welsh will describe the role of ENaC, degenerins, and sensory transduction. Mechanical forces also regulate exocytic and endocytic traffic in epithelial cells. In umbrella cells, which line the surface of the renal pelvis, ureters, and bladder, stretch stimulates vesicle exocytosis and endocytosis. The coupling of these events and the secondary messenger cascades involved in mechanotransduction will be presented by Apodaca. Stretch stimulates secretion of ATP in several epithelia, including those found in the kidney. Schweibert will discuss mechanisms of ATP release and the signaling that occurs upon ATP binding.

The History and Physiology of High Altitude Decompression Sickness

APS History of Physiology Group
Suzanne Schneider and Michael R. Powell
J. Webb, M. Gernhardt

During exposure to hypobaric environments, individuals are exposed to a reduced ambient pressure, thus increasing the risk that inert gases may be expelled from body tissues in the form of bubbles and result in decompression sickness (DCS). To allow a safe exposure to a decrease in ambient pressure, the rate of pressure reduction must be controlled and/or appropriate countermeasures must be developed to reduce the rate of bubble formation or to minimize the physiological consequences. Webb will discuss the history, physiology, and prevention of DCS in aviators. Gernhardt will discuss the history of DCS during spaceflight, possible effects of microgravity on the occurrence of DCS, and the development and implementation of the current prebreathe countermeasures used by NASA to prevent DCS during space walks. These two presentations will be followed by short topics related to DCS, questions, and open discussion.

"IACUC 101" for Scientists

Experimental Biology Symposium
John Stallone
Speakers: TBA

A half-day symposium on the workings of the Institutional Animal Care and Use Committee (IACUC) will be presented

on Friday, April 11 from 1-5 PM. This program has been specially adapted from the popular "IACUC 101" series. It is intended to address the concerns of research scientists and will provide information useful both to scientists who serve on IACUCs and those whose protocols require IACUC review. There will be opportunities to ask IACUC experts and representatives of regulatory authorities questions about what the IACUC is required to do and how principal investigators can cope with these demands.

Note: There is no charge for this session, but seating is limited so you must register to attend. Email Alice Ra'anan at araanan@the-aps.org to register.

Symposium topics will include IACUC functions and responsibilities, the protocol review process, and regulatory changes on the horizon. Participants can raise topics for discussion with representatives of NIH's Office of Laboratory Animal Welfare, the USDA's Animal Care program, and the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC), International.

Neurogenic Hypertension

APS Neural Control & Autonomic Regulation Section

Alan Sved

R. Victor, M. Esler, A. Sved

The central nervous system plays a large role in the control of blood pressure, and data from a variety of sources suggest that altered neural control of blood pressure may be a primary factor in hypertension. However, the extent to which hypertension is neurogenic is often debated. The goal of this symposium is to highlight the data demonstrating that human hypertension can be neurogenic, and to present recent developments on the central neurobiology of hypertension. The symposium will begin with a discussion of neurogenic hypertension from a clinical perspective, and then move through the interface of clinical hypertension with experimental models of hypertension, to the neural circuits driving increased sympathetic vasomotor outflow in experimental hypertension.

Mechanisms for Contractile Depression in Heart Failure

APS Muscle Biology Group

Richard A. Walsh and Kenneth R. Chien

E. G. Kranias, R. J. Solaro, K. R. Chien, R. A. Walsh

Remarkable insight into the mechanisms responsible for pathologic cardiac hypertrophy and myocardial contractile depression has been generated from molecular biochemical and cell biological approaches. The overall focus of this symposium is to review new and controversial information regarding key contributors to this process. In particular, there is a substantial body of evidence which suggests alterations in the stoichiometry and function of the sarcolemmal and cellular ion pumps channels and regulatory proteins responsible for calcium homeostasis in the cardiac myocyte. Similarly, a variety of laboratories have suggested that myofilament calcium sensitivity may be decreased unaltered or increased in a variety of different experimental situations and in human congestive heart failure. There is increasing evidence that cytoskeletal abnormalities are present and may contribute to disordered contractile function in genetically determined cardiomyopathies. Finally, a variety of different cell signaling pathways have been implicated in altered contractile function in congestive heart failure. The relative importance of these various different subcellular processes is incompletely understood and a subject of considerable debate and will be a focus of this symposium.

The Identities of Estrogen Receptors Mediating Nongenomic Effects

APS Physiological Genomics Group

Cheryl S. Watson and Phil W. Shaul

R. X-D Song, P. Thomas, C. Frye, C. D. Torrand-Allerand

Cellular steroid receptor action has been thoroughly studied in the nuclear compartment. However, nuclear steroid receptor mechanisms have been unable to explain some of the rapid activities of steroids, particularly those that occur in a time frame of seconds to minutes. Based on these and other considerations, an alternative membrane-associated receptor form was proposed in the 1960s to mediate nongenomic steroid actions. Only recently have reports describing these receptors become more prevalent, because new experimental tools have been applied to identification of these proteins which mediate rapid steroid-induced actions.

The identity of the protein(s) mediating these responses is perhaps the most frequently debated question in this re-emerging field. There are several possibilities for classes of proteins which might mediate or participate in nongenomic steroid actions. These include: nuclear steroid receptor-like forms in nonnuclear locations, other known (non-steroid) membrane receptors with additional steroid binding sites, enzymes or transporters, receptors for serum steroid binding proteins, unique and previously undescribed proteins, or chimeras of a steroid receptor domains with other unique or known protein domains. This symposium session features examples from several of these categories, focusing on one hormone-binding class—the estrogens. Only further study and comparisons will reveal whether some or all of these explanations persist, and whether additional pieces of the puzzle will allow the merging of different hypotheses about the nature of these proteins. Interestingly, a few proteins have recently been reported to have dual identities. In addition, the partnering and clustering of proteins into functional units, and the mix-and-match nature of these associations to meet different cellular needs may also assist in understanding this story. Therefore, it is critical at this time to compare different examples and concepts about the nature of membrane steroid receptors.

New Roles for Ammonia in Renal Ion Transport

APS Renal Section

I. David Weiner and L. Lee Hamm

S. M. Wall, I. D. Weiner, L. L. Hamm, C-H Huang

Recent studies have identified exciting new aspects of ammonia-related physiology in the kidney. These include

observations that ammonia regulates collecting duct transport of sodium, potassium and H/HCO3. Indeed, these observations serve to explain the decades-old observation that hypokalemia stimulates proximal tubule ammonia production. Studies have shown that increases in proximal tubule ammonia production cause decreases in urinary potassium excretion (human studies), that this occurs by decreasing net potassium secretion in the collecting duct (rat in vivo micropuncture studies), that ammonia both inhibits collecting duct principal cell-mediated potassium secretion (rabbit in vitro microperfusion studies) and stimulates collecting duct intercalated cell-mediated potassium reabsorption (rabbit in vitro microperfusion studies). Thus, ammonia may function as an intrarenal paracrine signaling molecule that serves to regulate potassium homeostasis.

In addition, ammonia also stimulates collecting duct proton secretion. These effects are independent of its role as a transported ion. Ammonia both stimulates unidirectional proton secretion and inhibits collecting duct bicarbonate secretion, and does so through a coordinated regulation of specific acid-base transporters. In particular, ammonia stimulates insertion of H-K-ATPase into the apical membrane of cortical collecting duct intercalated cells through stimulation of SNARE-protein mediated vesicular shuttling and membrane fusion. Thus, ammonia can also serve as a paracrine signaling molecule that regulates renal acid-base transport.

Last, a novel set of ammonium-transporting proteins has been cloned and shown to be expressed in the kidney. These proteins, Rh B Glycoprotein and Rh C Glycoprotein, are expressed in the convoluted tubule and the collecting duct, major sites for ammonium transport. Moreover, they are homologous with Rh A Glycoprotein, a component of the Rh complex on erythrocytes, and with ammonium transporters cloned from plants and yeast. The identification of these newly recognized proteins, that exhibit no significant homology with other known mammalian ion transporters, raises exciting new possibilities in the field of renal ammonia transport and metabolism.

AT-1 and AT-2 Receptors: Antagonists in Cellular Action?

APS Cross Sectional Symposium

Colin Sumners and Meredith Hay
S. Karnik, U. Quitterer, C. Sumners, H. Siragy

Mammals contain two major subtypes of receptors for the peptide angiotensin II (Ang II), the AT-1 and AT-2 receptors. The AT-1 receptor is well-known to mediate all of the classical physiological actions of Ang II, whereas the functions of AT-2 receptors are less well established. Recent studies have begun to uncover the physiological roles of AT-2 receptors, and in many cases it appears that they are opposite to the actions of Ang II via its AT-1 receptors, leading to the suggestion that these receptor subtypes have antagonistic roles in mammalian tissues. The overall goal of this symposium is to address the issue of AT-1 and AT-2 receptor antagonism by describing up-to-date studies on these receptor subtypes, focussing on studies which indicate that they play opposite roles. Material covered will include data from molecular, genomic and physiological approaches, providing an analysis of these receptors and their interactions at the cellular and whole animal levels. The symposium will begin with a presentation by Karnik, who will give an overview of the structural and signaling properties of AT-1 and AT-2 receptors. This presentation will illustrate how different the AT-1 and AT-2 receptors are in terms of structure and signaling, and lay the groundwork for a presentation by Quitterer on the AT-2 receptor as an AT-1 receptor antagonist. Quitterer's work will introduce the idea that antagonism between these receptor subtypes occurs at the level of receptor-receptor interactions rather than involving downstream signaling events. Sumners will raise the issue of whether opposing AT-1 and AT-2 receptor actions are due to interactions at the post receptor level. To illustrate these points he will discuss the AT-1 and AT-2 receptors in central tissues, their opposing effects on signaling pathways and their counteracting electrophysiological responses. Siragy will deal with the issue of AT-1 and AT-2 receptors and their opposing effects at the whole animal level. His focus will be on the cardiovascular actions of Ang II, in particular the vasodilatory effects via the AT-2 receptor and how they may contribute to the control of blood pressure given the powerful vasoconstrictor actions of Ang II via the AT-1 receptor. The symposium will be wrapped up with a brief presentation from Hay on the possible future directions of this field. The material covered in this symposium will be of specific interest to investigators within the renin-angiotensin field of study, in particular those involved in the cell signaling, cardiovascular, renal and neural aspects. We also believe that this symposium will be of broad interest to the physiology community since it highlights new and controversial issues surrounding an important peptide, and displays how one peptide acting through two different receptors can elicit such dramatically diverse and opposite actions.

Remodeling of the Brain Underlies the Success of Behavioral Therapies for Motor Dysfunction

APS Central Nervous System Section

Edward Taub
M. M. Merzenich, R. J. Nudo, E. Taub, T. Elbert

While studies over the past century have elucidated the mechanisms by which the central nervous system controls behavior, other experiments demonstrate that behavior has a profound reciprocal effect on the organization and function of the brain. This later finding are being successfully used to design new therapeutic approaches to motor dysfunction that are becoming effective first line methods for rehabilitation. The speakers in this symposium will detail the new insights that research in this area provides to our understanding of brain plasticity in the human. Massive reorganization occurs in the adult nervous system of animals and humans in response to both injury and increased use. Merzenich will demonstrate that the primary somatosensory and auditory cortical fields in intact, behaving rats and monkeys can be dramatically refined—or profoundly degraded—by specific forms of training, and he will elucidate the corresponding positive and negative plastic changes that occur in

intact humans in response to dysfunction and intensive training-based remediation of dyslexia and other conditions. Nudo will illustrate functional reorganization in the intact motor cortex of adult primates after a focal lesion to the cortical representation of the hand. He will describe the relationship of these changes to behavioral recovery of manual skill during rehabilitative training. Taub will show in humans that Constraint-Induced Movement therapy (CI therapy) greatly enhances the amount of recovery of motor function in an affected upper extremity in patients with chronic stroke which persists for at least the two years measured to date. The treatment effect is associated with a large reorganization in the motor areas of the cortex. Elbert will present human imaging data indicating that massed practice leads to alterations in the functional organization of the cortex. This cortical reorganization can be adaptive or maladpative. Focal hand dystonia, for instance, is related to a merging of the cortical representation of the affected digits. An effective treatment for focal hand dystonia is described that has the effect of separating the cortical finger representations. Together these speakers will demonstrate the powerful new insights that this area of research has provided to neuroscience, and in turn the clarity that modern neuroscience has provided to the mechanisms underlying these clinical approaches.

Non-Arterial Circulations: the Dark Side of Cardiovascular Biology

APS Comparative Physiology Section

Steve Warburton and Tobias Wang

T. Hoagland, S. Warburton, C. Pang, M. Hedrick, K. Olson

The vast majority of physiological investigations into circulation have focused on the high-pressure arterial system, and either ignored or gave a brief nod to other components such as the venous system, lymphatic system or the unique secondary circulation of fish. Most comparative treatments of circulatory regulation have focused on arterial pressure and the same can be said for evolutionary treatments. This trend persists, despite the fact that the importance of the Frank-Starling mechanism of intrinsic cardiac regulation has long been recognized. It seems imperative to begin a systematic dialogue on other components of circulatory systems and thereby formally recognize the arterial circulation does not function autonomously. The topics will include venous circulation in several vertebrate orders, lymphatic hearts and regulation, and the secondary circulation in teleosts. All the previous topics involve circulatory systems that are under some degree of regulation or potential regulation and are therefore potentially vital links in beginning to understanding the evolution of the cardiovascular physiology as an integrated system.

Section-Sponsored Featured Topics

Muscle Fatigue
William T. Ameredes
Tissue Response to Ischemic Injury: Adaptative and Rengenerative Strategies
David P. Basile
Integrated Cell Systems
James Bassingthwaighte
Developmental Plasticity of Respiratory Control
Ryan W. Bavis
Evolution of Vascular Regulation From the Neonate to the Aging Adult: Mechanisms and Functional Consequences
Matthew Alan Boegehold
Central Neurons and Efferent Pathways Controlling Thermoregulation
Jack A. Boulant and Kazuyuki Kanosue
Cardiovascular Physiology: From Bench to Classroom
Richard Bukoski and Charles Seidel
Development of Excitation-Contraction Coupling in the Embryonic Heart: From Simplicity to Complexity
Tony L. Creazzo
Oxidant Mechanisms in Neural Regulation of Cardiovascular Function
Robin L. Davisson
Control of Coronary Blood Flow (Berne Lecture Featured Topic)
Eric O. Feigl
Therapeutic Potential of Hypothermia: Bridging the Gap Between Clinical and Basic Thermoregulatory Research
Christopher Gordon and Michael Dae
Functional Brainstem Anatomy: Can We Tell Cardiovascular and Respiratory Neurons Apart?
Paul Gray
The Lung—A Very Special Place for Dendritic Cells
Gabriele Grunig
Interaction Between Histone Acetylation and DNA Methylation
Alessandro Guidotti
Intermittent Hypoxia: Physiological and Genomic Consequences
Gabriel Haddad
Causes and Consequences of pH Variability in Vertebrates
Lynn Hartzler
Glial/Neuronal Bi-directional Signaling
Glenn Hatton
Preconditioning of Myocardium Against Infarction
Franz Kehl and David C. Warltier
Epithelial Anion Channels: Structure, Form, Function
Kevin Kirk and Catherine Fuller
Structure and Regulation of Epithelial Na and K Channels
Thomas R. Kleyman and Douglas C. Eaton
Reflex Regulation of Airway Function and Breathing
Lu-Yuan Lee and Brendan Canning
Nitric Oxide and the Cardiovascular System (Wiggers Award Featured Topic)
Allan Lefer
Neurohumoral Control of Body Fluid Volume and Arterial Pressure
T. Lohmeier
AstraZeneca Young Investigator Featured Topic
Jeffrey Miner
Is it the Physiology, the Students, or is it Me? Reflections on the Classroom
Harold Modell
Trafficking of Membrane Transporters in the GI Tract and Beyond
Curtis Okamoto
Comparative Aspects of the Hormonal Responses to Metabolic Demands
Rudy M. Ortiz
Identifying Genes and Targets in Cardiovascular Autonomic Pathophysiological States
Julian Paton
Regulation of Vascular Smooth Muscle Cell Phenotype: Contractile versus Proliferative
Usha Raj
Hypertension (Starling Distinguished Lectureship Featured Topic)
Richard Roman
Insights on Renal Function and Blood Pressure Control From Genetically Manipulated Animals
Richard Roman
The Molecular Physiology of HCO^-_3 Transport
Michael Romero and Mark O. Bevensee
New Insights on Neuro-Immune Interactions in Autonomic Regulation
Yvette Tache
Hypoxic Metabolic Response: Autoregulation, Acclimation and Adaptation
Glenn Tattersall
Arteriogenesis and Collateralization
Joseph L. Unthank
Regulation of Ion Transporter Trafficking
Wenhui Wang
The Regulation of Sympathetic Nerve Activity in Chronic Heart Failure
Irving Zucker

Physiology and Experimental Biology 2002

Experimental Biology 2002 was held April 20-24 in New Orleans, LA and was a joint meeting of seven FASEB societies. The principle-programming societies were: American Physiological Society (APS), American Society for Biochemistry and Molecular Biology (ASBMB), American Society for Pharmacology and Experimental Therapeutics (ASPET), American Society for Investigative Pathology (ASIP), American Society for Nutritional Sciences (ASNS), American Association of Immunologists (AAI), and American Association of Anatomists (AAA). The APS hosted six guest societies: American Federation for Medical Research (AFMR), Association of Latin American Physiological Societies (ALACF), Biomedical Engineering Society (BMES), the Microcirculatory Society (MCS), Society for Experimental Biology and Medicine (SEBM), and the Spanish Physiological Society (SECF).

EB '02 marked the first meeting-wide theme adopted by all participating societies entitled "Translating the Genome." Several societies scheduled sessions relating to the genome and genomic research. The EB Meeting hosted a symposium organized by the FASEB MARC Program entitled "Genomics: A Unified Approach to Solving Diverse Problems in Health and Disease" which provided a forum for interaction between minority junior and senior scientists and included selected genomics-related posters that were displayed throughout the symposium. Additionally, EB hosted a FASEB Public Affairs symposium entitled "Bioterrorism: New Threats Facing the Nation, New Challenges for the Scientific Community," featuring Anthony Fauci of NIAID, NIH; Tara O'Toole of Johns Hopkins Center for Civilian Biodefense Strategies; and Julie Louise Gerberding of the Centers for Disease Control and Prevention. Special posters were scheduled throughout the meeting related to teaching and the use of computers in research and teaching.

A total of 6,977 volunteered abstracts were submitted for presentation by the submission deadline of November 7, 2001. Thirty-five percent (2,444) of the total abstracts submitted were sponsored by APS or its guest societies and 34% (2,416) of the total were submitted to APS topic categories. Additionally, 577 late-breaking abstracts were accepted with a deadline of February 28, 2002 of which 21% (123) were from members of APS or its guest societies. Late-breaking abstracts were scheduled as posters on the last day of the meeting and printed in the program addendum.

Of the 2,416 abstracts programmed by APS, 27% (654) had female first authors, 11% were received from institutions outside The Americas (representing an 11% decrease from EB 2001), 3% (82) were from US government laboratories, and 1% (30) were from industry. The decrease in foreign abstracts can be attributed to lingering concern resulting from the September 11 attacks on the United States. Table 1 provides the departmental affiliations of the abstracts programmed by APS and indicates that 22% (539) were from departments of physiology and 5% (144) were from departments of physiology and biophysics.

Table 1. EB '02 Author Affiliations of Abstracts Submitted to APS for Programming

Departmental Affiliation	Number of Papers	% Total
Physiology	539	22
Biology/Biomedical Sciences	204	8
Medicine/Internal Medicine	200	8
Pharmacology	156	6
Physiology & Biophysics	144	5
Cellular/Molecular	95	3
Cardiology/CV Sciences	88	3
Surgery	82	3
Bioengineering	80	3

The APS programmed a total of 318 scientific sessions including, 189 poster sessions, 47 symposia, 53 featured topics, 17 lectures, 4 workshops, 4 Physiology InFocus symposia, 1 poster discussions, 1 forum, 1 tutorial, and 1 refresher course. The lecture sessions included 12 Section Distinguished Lectureships, the Walter B. Cannon, Henry Bowditch, and Walter C. Randall, FASEB Excellence in Science Award, and The Microcirculatory Society's Landis Award lectures.

Session highlights included four workshops: "Understanding Organ Function through Real-time Fluoresence," chaired by **Jahar Bhattacharya** and **Bruce Pitt**; "Peer Review and Publication of APS Journals," chaired by **Dale Benos**, "How to be a Good Mentor: How to be a Good Mentee," cosponsored by the ASPET and chaired by **Robin Davisson**; "Physiology and Risk Assessment: Predicting Adverse Effects of New Chemicals on Critical Organ Functions," chaired by **Lewis Kinter** and **Alan Bass**; and one tutorial entitled "Bioinformatics for Physiologists," chaired by **Peter Tonellato**. The Public Affairs Symposium entitled "Everything You Ever Wanted to Know about the IACUC but were Afraid to Ask," chaired by **John Stallone**, was supported by the NIH Office of Laboratory Animal Welfare and jointly sponsored by six of the seven primary participating societies. The Refresher Course was entitled "Recent Advances in Neuroscience," chaired by **Cheryl Heesch** and **J. Thomas Cunningham**. In addition, **Phyllis Wise** selected EB 2002 as the venue for her FASEB Excellence in Science Award Lecture entitled "Estrogens: Potent Protective Factors in the Adult and Aging Brain."

The Physiology InFocus Program, organized by **John Hall**, was entitled "Translating the Genome: Physiology

and Pathophysiology of Obesity" and included four symposia: "Gene Environment Interactions in Obesity," chaired by **Theodore Kurtz** and **James Hill**; "Neurobiology of Obesity," chaired by **William Haynes** and **Michael Schwartz**; "Endocrine/Metabolic Consequences of Obesity," chaired by **Barbara Horwitz** and **Barbara Kahn**, and "Obesity and Cardiovascular Regulation," chaired by **Allyn Mark** and **John Hall**.

The APS Mixer was held on Saturday evening and included sumptuous desserts, dancing, and an opportunity to meet with colleagues in a relaxed, festive atmosphere. The fourth annual Young Experimental Scientist (Y.E.S.) Mixer, designed to enhance interaction between younger members of the participating societies, was held on Monday and was very well attended.

The total meeting registration was 14,537 of which 11,228 were scientific registrants. The scientific registrants were represented by 5,329 (47%) members, 135 (1%) retired members, 2,901 (26%) nonmembers, and 2863 (25%) students. EB 2002 marked the first year where registration was offered to high school teachers and students and undergraduate students at no cost. There were 219 (1% of the total registrants) high school teacher/student registrants and 633 (4% of the total registrants) undergraduate registrants. Additionally, the total registration included: 2,022 (14%) exhibitors, 195 (1%) guests of exhibitors, 205 (1%) guests of scientists, and 35 press registrants.

The American Physiological Society gratefully acknowledges financial support through educational grants from Taylor University, Upland, Illinois, National Institutes of Health, Office of Laboratory Animal Welfare, The Grass Foundation, the William Townsend Porter Foundation, Wyeth-Ayerst Pharmaceuticals, ADInstruments, and GlaxoSmithKline Pharmaceuticals. ❖

Career Opportunities in Physiology

Career Development Symposium

Francis L. Belloni
Chair, APS Career Opportunities in Physiology Committee

In a "simpler" time, the career aspiration of most students in physiology graduate programs was to become a university professor, like their mentor. Today, as the physiological sciences have become cornerstones of many endeavors in our society, the career paths open to physiologists have multiplied into a broad array. While recent observers of science have expressed concern about possible "over-production" of PhD's, the employment of PhD's in the life science remains high. But where those PhD's are employed is an evolving picture. So, a newly hatched PhD looks out from his or her graduate school "nest" and sees a far more complex environment than their predecessors of a generation ago.

The APS Committee on Career Opportunities in Physiology has tried to help these fledgling physiologists by providing information about this complex environment. One such effort is the Career Development Symposium we sponsor each year at the Experimental Biology meeting. This year, in New Orleans, we invited four individuals who started their careers in quite a uniform fashion. Three earned their PhD's in physiology, while one of the four panelists earned her PhD in biology, followed by postdoctoral training in physiology. But from this similar base, these four physiologists followed quite different career paths—paths that led to research-intensive universities, a small liberal arts college, the pharmaceutical industry, government agencies, a philanthropic foundation, and a daily newspaper. If you are paying attention, you'll immediately realize that this adds up to more than four careers because some of these participants have made major mid-stream changes in direction and have enjoyed two or more "careers," just by themselves.

Our motivating philosophy is that physiology is an exciting field and that it turns up in many different places and contexts. Moreover, each physiologist has a unique set of skills, motivations, character and personality traits, and life goals. The path to true career success, therefore, is to take stock of one's own abilities, goals, and values and then to find a job and career that match up with your own personal list. Too often, we tend to follow the traditional path instead of finding the one that suits us. Friedrich Nietzsche wrote, "Along the journey we commonly forget its goal. Almost every vocation is chosen and entered upon as a means to a purpose but is ultimately continued as a final purpose in itself. Forgetting our objectives is the most frequent stupidity in which we indulge ourselves."

As you read through the articles by three of our four speakers, you will see each one come to an understanding of what their own true purpose is. It is different for each of them. In fact, each person must find his or her own "purpose (1)." Our purpose is the relatively straightforward one of helping you to see the possibilities open to you.

References

1. Nietzsche, F. *The Wanderer and His Shadow, Aphorism 206: Forgetting our objectives*. 1880.

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Careers in Physiology: Opportunities in Academia

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St. Olaf College
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At the Experimental Biology 2002 Meeting in New Orleans, I was asked to say a few words at an APS symposium about career opportunities for physiologists in academia. This essay summarizes my comments at this symposium.

Although I will share some thoughts about academic careers in a broad range of colleges and universities, my background qualifies me to comment from personal experience only on two areas of academia. From 1987-1994, I was an Assistant and eventually Associate Professor of Physiology in the School of Medicine and Biomedical Sciences at the State University of New York (SUNY) at Buffalo. Based on this experience, I will share some thoughts on career opportunities at a research university. In 1994, I left the research university environment for the Biology Department at St. Olaf College, a liberal arts college located in Northfield, MN. Having been there eight years, I now have a perspective on being a physiologist at a liberal arts college.

This essay looks at academic careers at two levels: *1*) university, and *2*) college. The opportunity to teach physiology and have a meaningful research program is available at both these levels. The primary distinctions in my experience between a faculty position at a university versus college are the balance between teaching and research and whether one's teaching and research is primarily restricted to undergraduates (college) or whether there are opportunities for teaching and research with graduate students (university).

Attractive Features of an Academic Career

Before commenting specifically about differences between faculty positions at universities versus colleges, I would first like to share what I have found to be most rewarding about an academic career. Many of these features are available in other careers as well, so this is not meant to indicate that these features are only available in academia.

First, academia is a noble profession. Throughout my own schooling, I had great respect for my professors and now, lo and behold, I am one. For those who feel a "calling" to influence young minds, academia is a wonderful opportunity to work with a true sense of vocation. It is a caring profession, with ample opportunity to have a significant impact in the lives of emerging adults, both through the classroom and through conversations with students on broader issues.

Second, I greatly treasure the flexibility and autonomy present in academia. I have quite a bit of flexibility in what and how I teach and in the areas of research I choose to pursue. And I am quite autonomous in terms of how I put together my daily schedule and how I go about my business. This, in my opinion, is one of the under appreciated aspects of academia.

Third, academia keeps me "on my toes." With so many young minds asking me probing questions and challenging what I say, there is no shortage of lively conversation. Academia is unpredictable. I never know when a student will drop by to ask a question, nor do I know where our conversation will lead. It may begin with a question about the cardiac cycle and end with a discussion of Middle East politics. Often times I look back on a day and find that the most memorable part of the day was something that was completely unanticipated. Personally, I like this.

Fourth, I enjoy the collegiality of academia. This is not to say that academia is free of interpersonal problems, but I can honestly say that I have established some very meaningful collegial relationships through the years. And collegiality extends in some cases to students as well. I find it very rewarding when a student moves from a student-professor relationship to a relationship where together we are colleagues in learning.

Fifth, academia provides, in my opinion, very decent financial rewards. Much is made of higher salaries in industry, for example, but I have to admit I make a very decent living in academia, certainly one that is sufficient for the manner in which I wish to raise my three kids. Most everyone knows that academia is not the choice if great wealth is a primary career goal, but I am very satisfied with what I earn, especially when I stop gazing upwards at higher paying jobs and contemplate how fortunate I am to do what I do.

Sixth, one of the clear perks of academia is the ability to take sabbatical leaves or other special kind of leaves. I just finished a year of sabbatical leave at the University of Virginia that was wonderfully rejuvenating both personally and professionally. I also had the opportunity, as part of the International and Off-campus Studies Program at St. Olaf, to lead a group of 17 St. Olaf students for five months of study in Asia. I am deeply grateful for these opportunities.

Finally, I will mention that academia continues in most cases to offer unusual job security in the form of tenure. I understand all the underlying reasons for why the tenure system was established, but sometimes I am amazed that two institutions, first SUNY-Buffalo and now St. Olaf College, essentially guaranteed me a job for life.

Careers at the University Level

I would like to separate my comments about careers at the university level into two categories, first talking about careers at major research universities and then at regional universities.

Major Research Universities

At major research universities, regardless of whether they are public (e.g. state universities such as the University of Michigan or the University of Virgina, schools where I was trained) or private (e.g. Stanford University or Yale University), a faculty member's primary responsibility will be to establish and maintain a productive research lab. Despite talk about the importance of teaching and service at such institutions, it would be rare for a major research university to tenure a professor who did not have a viable research program,

regardless of teaching evaluations or the level of service to the institution. Therefore, if you are considering trying to find a job at a major research university, I suggest that you ask yourself very seriously whether you have a deep passion for research. If the answer to that question is "no," a research university is probably not a good match for you, as the pressure to stay up to date with the literature, to maintain funding, and to be productive, not to mention the day-to-day challenges of running a research lab, can be overwhelming at times. On the other hand, if research is your passion, then the rewards are plentiful-scientific discovery, training graduate students and postdoctoral fellows, meaningful collaborations, travel, and autonomy, just to mention a few.

Regional Universities

One of the distinguishing factors between major research universities and regional universities is likely to be the amount of contact with undergraduates. Research and curricular programs at regional universities often have a significant undergraduate component, whereas at research universities the focus is more exclusively on graduate programs. Therefore, one of the questions one should ask when considering a regional university (e.g. Central Michigan University or Winona State University) is about preference for working with undergraduate versus graduate students. On the continuum from exclusively graduate student involvement to exclusively undergraduate involvement, regional universities probably offer the most balance. Research is usually highly valued and there are often very competitive start up packages. One perhaps forfeits the honor of being at "prestigious" research university, but the quality of life and ability to make a significant impact in the lives of students has the potential to be very high at a regional university.

Careers at the College Level

Although there are many differences between a career at a university and a college the biggest differences in my experience involve the clientele and the role of teaching. At the college level, professors work almost exclusively with undergraduates (or in some cases continuing education students) and teaching plays a much more prominent role in professional evaluation. Therefore, regardless of the type of college that one is at, a meaningful career can be had if one enjoys contact with students and one has a passion for teaching.

I would like to share thoughts about faculty positions at two different types of colleges: *1*) research-active liberal arts colleges, and *2*) four- and two-year primarily teaching colleges.

Research-Active Liberal Arts Colleges

Increasingly, liberal arts colleges are encouraging and supporting undergraduate research. When I made my career move from SUNY-Buffalo to St. Olaf College, I moved to one such institution. While I am expected to be entirely responsible (i.e., no team teaching or graduate assistants) for teaching semester-long courses (my primary course is Human Anatomy and Physiology), it is also clear that undergraduate research is an important mission of the college. I was given a generous startup package and sufficient lab space, and joined a department that had several funded investigators and a vigorous summer research program supported primarily by the Howard Hughes Medical Institute. For me, this has been the best of both worlds, as I work closely with talented undergraduates in several teaching-related venues, thus satisfying my passion for teaching, but still maintain an active research laboratory. However, my research laboratory at St. Olaf College is very different than my research laboratory at SUNY-Buffalo. At St. Olaf: *1*) one of the core missions of the lab is clearly to provide a rigorous training experience for undergraduates; *2*) the research questions are geared to those that can be answered by undergraduates with limited time in the lab; *3*) I personally spend much less time in the lab; and *4*) my professional success is not nearly as tightly linked to my research success.

When I moved from SUNY-Buffalo to St. Olaf College, I expected to find it more challenging to secure external funding for my research program. In fact, to my surprise I found several funding opportunities that were restricted for undergraduate research. Both the National Institutes of Health (NIH) and the National Science Foundation (NSF) have programs that support investigators who are not at major research universities. For example, NIH AREA (Academic Research Enhancement Award) grants are an excellent source of funding for investigators at research-active liberal arts colleges.

Four-Year Primarily Teaching Colleges

Many four- and two-year colleges provide excellent classroom instruction in biological sciences, but do not have the infrastructure or resources to support undergraduate research. Because research is not a primary expectation of the job, teaching loads tend to be heavier than at research-active liberal arts colleges. Since this increases the opportunity to interact closely with students, this can provide a very meaningful career for the person who loves to teach physiology. However, although one can stay active in research through off-campus collaborations, positions such as these provide little opportunity for meaningful on-campus research. Therefore, one must be clear when accepting a position at a primarily teaching college that research will likely be small component in one's career relative to teaching.

Conclusions

Despite the increase in non-academic opportunities for physiologists, academia continues to provide a variety of options for a meaningful career. As in any career choice, it is wise to carefully assess one's career passions when deciding which path to take, but people with a passion for teaching and/or research can be richly rewarded by a career in academia.

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Medical and Science Reporting: Another opportunity for graduate students

Kawanza L. Griffin
Medical Reporter
Milwaukee Journal Sentinel

So what's a medical reporter and why would a physiologist work at a newspaper in the first place?

I thought I'd answer this by first giving you a little background about myself and why I made the transition from the laboratory into the newsroom before discussing the duties of the reporter and the job opportunities that exist for those of you who might be interested in pursuing a similar path.

In 1994, I graduated from Xavier University in Louisiana with a BS in Biology and entered the PhD program for Physiology at the University of Missouri in Columbia. While there, I worked under the excellent leadership of Janet Parker, who is now with the Department of Medical Physiology at Texas A&M, and M. Harold Laughlin, currently the chairman of the Department of Veterinary Biomedical Sciences in Columbia.

Although I thoroughly enjoyed being in the laboratory, by 1997 I was realizing that I loved writing and talking about my research much more. At about the same time, I was getting many questions from my family—particularly my grandparents—about what I was going to do when I grew up, and found myself constantly having to explain the impact my research would have on understanding the benefits of exercise training in patients with known coronary heart disease.

I also realized that for me, the life of the researcher—long, tedious days and nights in the laboratory, grant writing and the pressure of publishing works in 'reputable' journals—did not fit my persona.

In late 1998, I saw a brochure for the Mass Media Fellowship sponsored by the American Association for the Advancement of Science (AAAS) on the Internet and thought that this was something that I could do, particularly since I'd been frequently contributing a health article to a local newsmagazine. But when I received my monthly newsletter from the American Physiological Society saying that for the first time they would sponsor a fellow, I realized that this was something I had to do.

After applying for the fellowship, I was accepted and placed at the *Milwaukee Journal Sentinel* for the summer of 1999.

My internship was to last three months, however, my mentor was leaving for a one-year fellowship and I was asked to stay until he came back. But to everyone's surprise, he decided to retire early, opening the position at the paper. I applied and became a full-time medical reporter in May 2000.

So what is it that I do?

The job of the journalist is to be the eyes and ears of the public and to do the necessary background research and interviews to report and write a story that accurately presents all sides of a given situation.

Reporting on science or medicine is considered one of many categories of beat reporting and many people who do it have either a science or medical background or have been reporting many years and worked their way up the chain to do it.

It is the responsibility of the medical reporter to keep abreast of the latest advancements related to health, medicine or disease and inform readers of these developments and the impact they could have on their lives. This is done by going through the key science or medical journals such as *Science* and *Nature*, *The New England Journal of Medicine* and any of the American Heart Association journals each week, as well as by keeping in close contact with researchers and health officials in the area. The AAAS also maintains an Internet site that reporters can register with to help them keep track of what's going on with many health- and science-related fields.

But regardless of whether you cover medicine, science, transportation, courts or cops, there are certain core characteristics that a reporter must possess to do the job effectively.

Good journalists not only write well, but have a natural curiosity about what's going on around them. But good writing begins with good reporting, and good reporters are always prepared because they've done adequate background research before talking to their sources; reporters are persistent and able to ask questions until they get an answer and they're skeptical of any information they are given because you should never believe what you're told. And good reporters are able to gather all this information and write a complete, accurate and enlightening story in layman, not scientific terms, under deadline pressure. So reporters must be motivated and able to handle multiple tasks.

The two biggest challenges? Language and trust.

As someone with a science or medical background, you already have an understanding of the language that is used and possess the ability to ask intelligent questions. But you will still have to learn to break the technical terms down into words that the reader can understand and to get the scientist or physician to speak to you using common, everyday language. A recent study by the American Society of Newspaper Editors found that readers want stories that are relevant to their community and that can help them live their lives, and that the average reader wants to be told a story that doesn't require a thesaurus or dictionary at their side.

Medical reporters also work under an embargo system, meaning that they have access to information from journals or health officials before the time that many of you see it in the paper, but are trusted to not cite or print anything related to that information prior to a given release date. This ensures enough time for comprehensive reporting and gives everyone an equal opportunity to pursue the story. So, regardless of how tempting it might be to 'scoop' other media outlets, it is not in your best interest to do so. You'll not only lose the trust of sources you need to develop stories you'll write—meaning they'll be hesitant to speak with you, if they talk to you at all, but you'll also no longer have early access to information or the respect of other

reporters in the field.

Medical reporting also requires you to become an instant "expert" on various subjects and be ready to prioritize and report them all on a given day. Although the people who read the newspaper are sometimes the best judges of what's newsworthy, they are the last people to actually view the story. Therefore, reporters and editors must determine what they believe will make their readers happy and able to make informed decisions about their lives.

If you believe that writing is something you'd like to do, you're probably also interested in finding out what the future holds for journalists. Of course, no one can answer that with any certainty because while it's true that the number of daily and weekly papers in the US is shrinking and fewer adults are reading, newspapers continue to be profitable and capture a larger audience than broadcast television. But more importantly, people are interested in medical and science issues, particularly if they believe it's relevant to them and their well-being. Writing opportunities exist not only at newspapers, but also at magazines, television, radio and in the pharmaceutical industry.

But you've got to make yourself marketable by taking advantage of any opportunities to write for the public and applying for fellowships, internships or programs such as the science writing program at the University of California, Santa Cruz or at a campus near you. Also, be sure to check out the National Association of Science Writer's web site at http://www.nasw.org for an excellent list-serve discussion they have archived, which gives beginning advice to science writers as well as book recommendations such as *A Field Guide for Science Writer*, edited by Deborah Blum and Mary Knudson. The site, as well as that of the AAAS (http://www.aaas.org) and the American Medical Writer's Association (http://www.amwa.org), also has sections devoted to job opportunities.

A Physiologist in the Pharmaceutical Industry

Christine G. Schnackenberg, GlaxoSmithKline Pharmaceuticals

Like most graduate students and postdoctoral fellows, I had no idea what it would be like to work in industry. After working for two years as a physiologist in industry, I have gleaned a few pearls that I would like to share with young scientists who are thinking about their future. I recommend that you read McHugh's thoughtful commentary entitled "Making the transition between academia and industry" in the October 2001 issue of *The Physiologist* (44:300-302). I would like to follow-up with some additional information from my perspective that may be helpful in making a career decision.

What jobs in industry are out there for me? The first question that budding scientists in a job search should ask themselves is "What exactly could I do in industry?" With a predominately academic background, my knowledge of the possible jobs for a PhD working in industry was equivalent to a "black box." Therefore, I will first provide a brief overview of the opportunities in industry for scientists with graduate degrees in the physiological sciences. The most commonly known position in industry is one in drug discovery. Scientists who work in drug discovery are primarily responsible for assessing and validating targets for new drugs. For example, the angiotensin II receptor was the target for the development of antagonists such as losartan. Drug discovery PhDs are also responsible for evaluating disease areas of relevance for developing new drugs, such as diabetic nephropathy. Scientists who work closely with those in drug discovery are in DMPK (Drug Metabolism and Pharmacokinetics). These PhDs are responsible for evaluating the metabolism and pharmacokinetics of drug candidates.

Physiologists in product support are responsible for establishing therapeutic proof of concept, differentiation, and in vitro and in vivo models relevant to the disease focus. For example, scientists first had to show that inhibition of the angiotensin II receptor reduced blood pressure in hypertensive animals before it could be progressed for development as an antihypertensive drug. Scientists working in safety assessment are responsible for evaluating the toxicology and clinical pathology of drugs in animal models. Physiologists also work in a relatively new area called high throughput biology where they characterize functional endpoints in cell lines, as well as transgenic and knockout animal models. These scientists also utilize imaging techniques for the analysis of normal and diseased tissues. For all of these positions, it is advantageous for the physiologist to have experience working with animal models of human health and disease. In addition to these positions, there are also several non-laboratory opportunities that are available to scientists with a graduate degree in the physiological sciences. For example, sales associates are a necessary part of the pharmaceutical industry. Clinical research associates help coordinate clinical trials and project managers follow a candidate drug from preclinical development through clinical trials and into market. All of these positions are available for a physiologist with at least two years of postdoctoral experience in academia or industry.

The "Pros" and "Cons" of Working in Industry

There are several advantages to working in industry. Foremost is the application of the physiology that you are studying. All of the physiological research conducted in industry has a human focus. The research that you perform is directly applied to improving human health and preventing or curing human disease. For your research, there are abundant resources available. Scientists with varied backgrounds and state-of-the-art equipment are readily available for your consultation or use. Finally, you are well-compensated for the research that you conduct. Industry provides competitive salaries and bonuses in addition to several long-term benefits such as stock options, retirement plans (pension/401K), health care ben-

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efits, etc. In addition to the monetary compensation, many companies encourage and support scientific growth within your company and in the scientific community at-large. Every job has its disadvantages. In industry, the same research has influences that are not necessarily similar in academia. Because the objective of the pharmaceutical industry is to make drugs to improve human health and cure or prevent human disease, the research can often be influenced by the market need. While researchers in industry are encouraged to investigate new ideas and/or drug targets, we are also expected to respond to the needs of project teams and therapeutic goals of the company. This can involve juggling a number of different efforts simultaneously. In addition, your research focus can often be more diffuse than research in academia. You will be working on multiple projects, which may be unrelated, at any one time. Scientists in industry occasionally have limited choice about the research that they are conducting. Indeed, a project that you have been working on for several years may be terminated by your team or management. Finally, timing is an important part of research in industry. Deadlines are definitive and are incorporated into your work. Because of the priority of the projects that you are working on, there is minimal time for unfocused exploratory research. Overall, conducting good science is very important in industry, but conducting good science that meets the objectives on time is a factor.

The Mindset of a Successful Scientist Working in Industry

With this background, you can probably discern the attributes of a scientist who is successful working in industry. Here are a few characteristics that I believe are important. ***Entrepreneurial***. Scientists in industry need to be creative but take intelligent risks. Have courage in decision making and willingness to prioritize and be held accountable. Be competent in analysis and solving problems. ***Initiative***. It is up to you to make things happen. Whether it is investigating a new target for a disease area, developing a new technique in the lab, getting a study completed, coordinating work between labs, or contacting someone, it is your responsibility to get the job done efficiently. ***Teamwork***. No one scientist in industry works alone on a project. Whether it is with other scientists (biologists and chemists), management, or clinicians, you will be working as a team towards one common goal. The overall development of a drug, your project teams, and management depend on your performance. ***Flexibility***. Working in a team environment requires flexibility. For example, if you planned on conducting studies for project A, but the results from studies for project B are needed sooner, then you will need to adjust your schedule accordingly. Another example is if a project is not meeting its goals after an agreed-upon period of time, then the project (not you!) can be terminated. You would then be working on something else. ***Well-Organized***. Scientists in industry are required to manage several projects and personnel and maintain laboratory work simultaneously. In addition to these direct responsibilities, you should also contribute to the greater scientific community at-large by presenting at scientific meetings and participating in scientific organizations.

Prerequisites for Employment in Industry: What Your Future Employer in Industry is Looking for in You.

Good science. Physiologists working in industry should have an excellent scientific knowledge base and at least two years of postdoctoral experience (in academia or industry). The type of research experience required vary depending on the position, but experience with animal models is a definite advantage. ***Publications***. Several publications in peer-reviewed journals are needed for employment in industry. Continued publication after employment is encouraged and may be a requirement for advancement in some companies. ***Communication skills***. Scientists in industry give several presentations to scientists, clinicians, and management in addition to writing reports. Therefore, effective written and oral communication skills are required. ***Leadership***. Scientists in industry have the ability to lead a project to completion including overall vision, troubleshooting technical aspects, and managing personnel. In your search for a position in industry, it is important to include evidence of these prerequisites in your cover letter, curriculum vitae, seminar, and interviews. When you leave an interview or site visit, your prospective employer should know how you could contribute to the company. He or she will also be thinking of what it would be like working with you since you will be working in a team. Don't leave the answers to guesswork. Keep in mind the attributes listed above and project them to your prospective employer. ❖

Experimental Biology 2003

Experimental Biology 2003 will be held from **April 11-15, 2003** in San Diego, CA. (Note the change from the original dates!) The Abstract Submission Deadline is **November 13, 2002.**

The online submission form will be available in early fall at http://www.faseb.org/meetings/eb2003. Check this site often for updates and deadline information.

Tailoring Search Results in the HighWire Library of the Sciences and Medicine: "Have it Your Way"

In the February 2002 issue of *The Physiologist*, we introduced the new HighWire Library of the Sciences and Medicine, which allows you to search all of Medline plus 300 journals' full-text at once—including all the APS journals, of course! In the last issue, we began a series of short articles highlighting tools or features of this new site, starting with the ability to quickly see which articles are freely available to you right in your search result. This month we continue the series with a look at tailoring a search result to fit your needs. The new site is at http://highwire.stanford.edu.

The search result pages in the new portal let you change your view of the results with just a click or two. This month we'll look at how to amend, sort, condense, investigate, and download search results.

Look at the top of a recent search result for "hypercapnia" (see figure) The top section of the new search result page makes it easy to adjust your result in several ways:

Amend the result: Your search terms are pre-entered for you in the **Quick Search** box. You can add or replace terms there and click "go;" or change the scope of your search from searching Medline to focus on the 300+ highly-cited journals whose full-text is found at HighWire by checking a different radio button and clicking "go."

Sort the result: The default sort for the search engine shows you "**best matches,**" meaning those articles in which your search terms showed up most frequently and prominently. Clicking on "**newest first**" will reorder your search result by date, displaying the most-recently-published articles first.

See more per page: By default, the search engine shows you 10 items on each page. You can ask for **25, 40, 60, or 80 results per page** just by clicking on the appropriate number. But note that a page that has 40 items on it will take longer to load than one with only 10 items.

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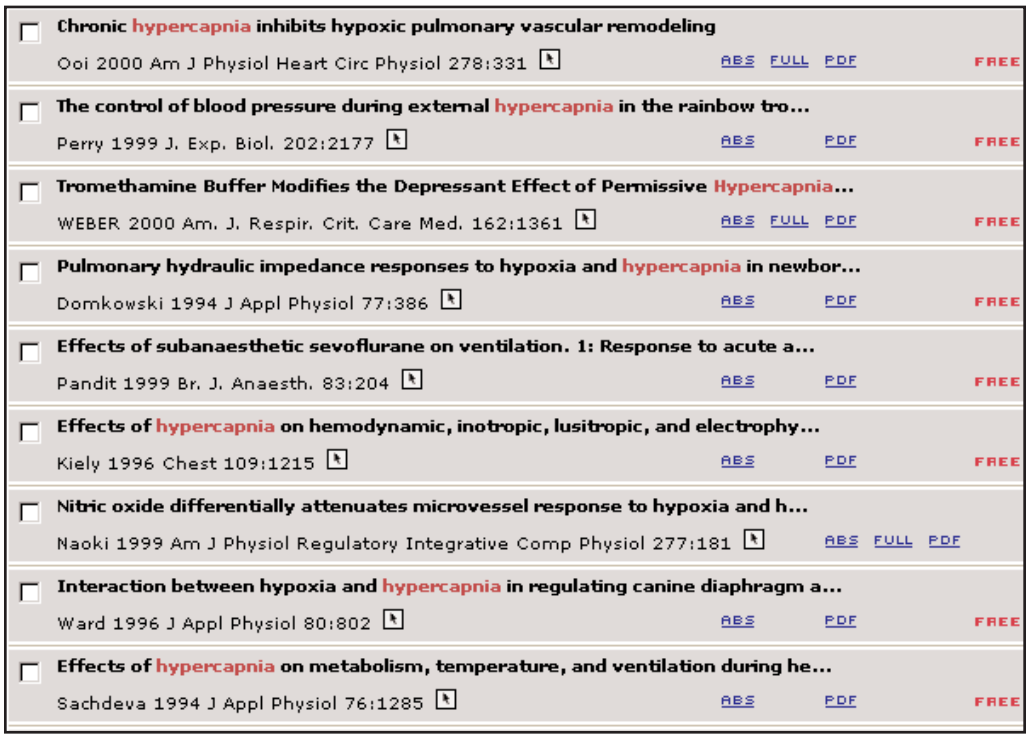
Condense the result: The standard form for each citation provides a lot of information, such as a full list of authors, full citation information, which section of a journal an article is in, whether the article is a review, etc. The "**condensed**" option displays all the basic citation information you'd find in a reference list, plus a bit more, and takes up only a quarter the space! It looks like this:



Working from results: If you've tried the HWLSM site, you might have noticed that it allows you to click on a link in a search result and go to an abstract or PDF by opening a new browser window, without losing your search result; it is almost as if you can "keep your finger on the page" of a search result while going off to explore new pages.

But there are other tools to help you work from results. By clicking in the checkbox to the left of any citation, then clicking the appropriate radio button under the box (to the right of the Search Result information) labeled "**For checked items**" you can do more with any article in a search result:

Download each checked item to your local **citation manager database**: You can quickly add citations and abstracts to your database in EndNote, ProCite, and Reference Manager. Online instructions are provided to be sure everything is set up for an automatic transfer. You can also download an individual article's citation/abstract to a reference manager when you are viewing it in a HighWire-based journal site.

Expand each checked item to its **abstract**: A web page of abstracts for the selection citations will come up in a separate window. Each abstract includes a full citation and a link to full-text. As you review pages of search results, you can accumulate possible candidate articles to evaluate further by checkmarking them. Then you can read through the abstracts all at once, print them, or click through to full-text.

In the next issue we'll look at how you can have the system keep track of your favorite APS journals. ❖

APS Awards

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

Award	*Next Deadline*
Shih-Chun Wang Young Investigator Award	November 1
Arthur C. Guyton Awards in Integrative Physiology	November 1
Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine	November 1
Lazaro J. Mandel Young Investigator Award	November 1
Procter & Gamble Professional Opportunity Awards	November 6
Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Awards	November 6

Research Opponents Launch Anti-Charity Campaign

Health charities that fund animal research are being targeted by the "humane seal of approval" campaign developed by the Physicians Committee for Responsible Medicine (PCRM) in conjunction with People for the Ethical Treatment of Animals (PETA). This "humane giving" campaign is predicated on the activist view that animal research is inhumane and lacks scientific value. Its goal is to pressure health charities to stop supporting animal research to develop cures.

In addition to PCRM and PETA, the other organizations participating in this campaign include the Medical Research Modernization Committee, the American Anti-Vivisection Society, In Defense of Animals, the National Anti-Vivisection Society, the New England Anti-Vivisection Society, Last Chance for Animals, and Beauty Without Cruelty.

Charities are classified as acceptable or unacceptable depending upon whether they sign a statement of assurance that they do not and will not "conduct, commission, or in any way fund Experiments on Nonhuman Animals." PCRM and PETA have recruited a number of celebrity spokespersons for the campaign and have developed ads encouraging the public not to give to organizations that fail to sign this pledge. The forerunner of this effort is a campaign PETA initiated against the March of Dimes in the early 1990s.

In an article published in the July 28, 2002 issue of *The Washington Times*, laboratory animal veterinarian John D. Young, chairman of the Americans for Medical Progress Board of Directors, described the campaign as an effort "aimed at stopping the humane and responsible use of laboratory animals in biomedical research." Young noted that PCRM and PETA have "attacked several of the nation's leading health research charities and have sought to drive physicians and scientists away from their quest to improve human and animal health."

Charities targeted because of their support for animal research include not only the March of Dimes, but also the American Heart Association, the American Cancer Society, St. Jude Children's Research Hospital, American Foundation for AIDS Research, the Christopher Reeve Paralysis Foundation, the American Red Cross and Boys Town. "Seventy charities in all are currently on PCRM/PETA's 'don't donate' list," Young wrote. "These are organizations that through their grants and contributions to biomedical research are responsible for hundreds of specific achievements in medical progress." Conversely, the charities being championed as humane are mainly "involved in patient assistance, not research." While these causes "do provide 'essential health services' and they deserve our support," Young pointed out that "the vital and necessary work performed by an AIDS hospice provides no hope for effective treatments or cures for millions of AIDS patients worldwide."

One can gain further insight into the "humane seal" campaign by looking at PETA's on-going efforts to erode public support for the March of Dimes. Starting in the 1990s with protests against the March of Dimes' fundraising walk-a-thons, this campaign now involves celebrity endorsements and more elaborate media events. PETA has even created a special anti-March of Dimes website (http://www.marchofcrimes.org), which includes the following statements:

"With the worthy goal of preventing birth defects, the March of Dimes collects millions of dollars in donations annually. But most donors who generously open their pocketbooks are unaware that their gifts help to fund painful experiments on animals. The March of Dimes has funneled millions of dollars into laboratory studies on primates, rats, mice, cats, dogs, rabbits, pigs, sheep, guinea pigs, opossums, and members of other animal species.

Both animals and human babies are the losers, because every dollar spent to harm these animals is a dollar that could have-and should have-been used to help people."

Research opponents are trying to encourage the public to look for the humane seal of approval before donating to charities. In addition to paid advertisements and various media stunts, supporters of this campaign are sending letters to the editor and submitting opinion articles asserting that animals are abused in laboratories and that data derived from animal research is not applicable to humans because of differences between species. Physiologists should take every opportunity to rebut these false claims.❖

Congressional Appropriations: The Final Stretch

As summer gave way to fall, congressional appropriators started down the final path towards passage of the 13 annual spending bills that fund the United States government including agencies that support biomedical research. By law, all 13 bills must be finished by October 1, the beginning of the fiscal year. Before leaving for the August recess the Senate appropriations committee had voted on the Labor Health and Human Services and Education (Labor HHS) bill and the Veterans Administration, Housing and Urban Development and Independent Agencies (VA-HUD) bill. However, the House is lagging behind passing their fiscal year (FY) 2003 version of these bills because of conflicts between conservatives and moderates over spending levels.

On July 16, 2002 Senators Tom Harkin (D-IA) Chairman of the Senate Labor HHS Appropriations Subcommittee and Ranking Member Arlen Specter (R-PA) held a press conference to announce that their subcommittee marked up a FY 2003 spending bill that provides $27.2 billion for NIH in FY 2003. This is a $3.7 billion or 16% increase over NIH's FY 2002 budget. Later in the day, the Senate Appropriations Committee approved the subcommittee's recommendation.

The APS submitted a press release (http://www.the-aps.org/pub_affairs/leg_act_cntr/news/nih_support.htm) praising Senators Harkin and Specter

for their effort in supporting the five-year doubling of the NIH budget. "Senators Harkin and Specter have been two of the Senate's fiercest advocates for biomedical research," commented APS Executive Director **Martin Frank**. With the doubling of the NIH budget they "have helped to open the door to progress which will pay enormous health dividends for this and many generations to come."

The House Labor HHS subcommittee was expected to take up its FY 2003 spending bill at any time. However, it was anticipated that it would be a contentious debate. Many factors make it difficult for the House subcommittee to match the Senate Appropriation Committee's $3.7 billion increase for the NIH. This included a fight between conservative members who want to hold the line on spending and moderates who want to see more money infused into the legislation.

The Senate also acted first in funding the National Science Foundation (NSF) and Veterans Medical and Prosthetic Research. On July 30, 2002 the Senate Appropriations Committee approved the FY 2003 VA-HUD spending bill. The measure provides $5.3 billion for NSF. This is 11% or $528 million more than the FY 02 enacted level and $288 million more than the President's request.

Nevertheless, there was concern over the lack of a funding increase for the biological sciences directorate (BIO) within NSF. Overall, the Senate VA-HUD committee provided increases of 12.3% to 20% for the other six directorates but only allocated a 3.4% increase for BIO. While the committee report did not identify why this disparity occurred, some on Capitol Hill have previously expressed the view that since biomedical research funded by the NIH has done very well, life sciences research at the NSF can be reduced in order to fund other disciplines.

In addition to NSF, the Senate VA-HUD committee also provided $400 million for VA medical and prosthetic research. This is $29 million above the FY 02 enacted level.

The House VA-HUD subcommittee is expected to draft its bill soon. House appropriators are expected to have a hard time also with this bill because they have less money to work with than the Senate.❖

House Agriculture Bill Would Halt USDA E-FOIA Disclosures

In July the House and Senate Appropriations Committee approved FY 2003 funding legislation for the Department of Agriculture. The House provided a 3% increase in funding for Animal Welfare Act (AWA) enforcement while the Senate bill provided 5% increase. The House bill also included language to prohibit the USDA from disclosing information that could be used by terrorists to target biomedical or agricultural research facilities. This was an effort to end FOIA disclosure of identifying information about research personnel and activities. The Senate bill did not include FOIA language.

The House Committee recommended $15.6 million for APHIS AWA enforcement, a $450,000 increase over the FY 2002 funding level. The President had requested $14.4 million for this activity, which includes annual inspections of registered research facilities to ascertain their compliance with AWA animal care guidelines. The Senate Committee recommended $16.4 million, an increase of nearly $800,000.

The House bill included language stating, "None of the funds appropriated or otherwise made available by this Act shall be used to pay the salaries and expenses of personnel to release information that may be used by individuals or terrorist organizations for the purpose of targeting biomedical or agricultural research facilities or personnel employed in biomedical or agricultural research." The Senate bill did not include this language so if both chambers approve the legislation as written, the issue will have to be resolved in conference.

The House language was intended to rectify a problem that emerged last October when the USDA's Animal and Plant Health Inspection Service (APHIS) began posting facility inspection reports to its E-FOIA website. Some of those reports included the names of research and veterinary personnel and specified rooms where research animals are housed and research is conducted. In February, then-APS President **John Hall** sent a letter urging APHIS/Animal Care Acting Deputy Director Chester Gipson to "revise procedures for the preparation of Animal Welfare Act (AWA) animal facility inspection reports and the release of these reports under the Freedom of Information Act (FOIA)." The APS asked APHIS to "reexamine what information is released under FOIA as well as the current practice of making these reports available over the Internet." Other research community organizations made similar appeals, and about this time, the USDA posted a notice indicating that facility reports had been temporarily removed from the E-FOIA website pending review of policies and procedures for posting them.

In the APS letter, Hall pointed out that a month after the September 11 attacks, Attorney General John Ashcroft issued a policy memorandum concerning FOIA to government agencies. The October 12, 2001 memorandum noted the need to balance the

Table 1. FY 2003 Biomedical Research Appropriations: A Look Inside the Numbers

Agency/Program	President's Request FY 2003	Senate Appropriations Committee FY 2003	House Appropriations Committee FY 2003
NIH	$ 7.3 billion	$27.2 billion	Not Complete
NSF	5.036 billion	5.35 billion	Not Complete
VA Medical Research	409 million	400 million	Not Complete

FOIA mandate to share information with the public with the protection of other "values and interests," such as "safeguarding our national security, enhancing the effectiveness of our law enforcement agencies, protecting sensitive business information and, not least, preserving personal privacy." The APS urged APHIS to revisit its FOIA procedures in light of this guidance.

Representatives of the biomedical research community met with Gipson in February to discuss this issue. USDA officials had previously stated that the agency believes it is obliged under FOIA to release AWA inspection reports exactly as written. That is, the USDA interpretation of FOIA is that except in the face of a very specific threat of harm, it is not allowed to redact the names of research or veterinary personnel or locations in the facility the animals are kept or research is conducted. The research community argued that while the USDA may need this information for its internal use, it should not be disclosed to the public, and particularly should not be published on the web. Furthermore, the reports essentially provided raw allegations of AWA violations that facilities often contested. Nevertheless, the USDA insisted on posting inspection reports as written even if the alleged violations had already been resolved in the institution's favor.

The concerns of the research community arose because of numerous violent acts that have been committed in the name of "animal rights." On February 12, 2002 FBI Domestic Terrorism Chief James F. Jarboe told the House Resources Subcommittee on Forests that the ALF and ELF have committed "more than 600 criminal acts in the United States since 1996, resulting in damages in excess of 43 million dollars." Jarboe identified the ALF as "a terrorist group, whose purpose is to bring about social and political change through the use of force and violence." He said that the "most destructive practice of the ALF/ELF is arson," generally involving "improvised incendiary devices equipped with crude but effective timing mechanisms."

Activists opposed to animal research frequently use FOIA to obtain copies of AWA facility inspection reports. This is a well-known technique for gathering information about research activities. Prior to E-FOIA, those requests provided a record of the individuals and organizations expressing interest in a particular facility. However, that ceased to be the case once reports were posted on the Internet. The animal extremists who align themselves with ALF and ELF have shown themselves to be net-savvy. The concern was that they could easily use anonymously-acquired information to select targets. The House language represented an effort to halt this practice to protect research and agricultural and facilities from this danger. ❖

2002 APS Mass Media Fellow - Emily Singer

This year's APS-sponsored AAAS Mass Media Fellow was **Emily Singer**. Singer, who recently received an MS in Neuroscience from University of California, San Diego, spent her summer at the *Los Angeles Times*.

After an overall positive experience, Singer has decided that she wants to continue to pursue a career in science writing. In the fall, she will begin a year-long intensive science communication program at the University of California, Santa Cruz, that will expand upon much of what she learned this summer. The following article details Singer's summer as a *Los Angeles Times* reporter. ❖

Emily Singer
AAAS Mass Media Fellow
Los Angeles Times

The *Los Angeles Times* building is a maze of hallways and desks, with 1,500 editorial staff members whipping themselves into a frenzy around the 5 PM deadline. When I first arrived, the surrounding confusion was an apt metaphor for how I felt. But after 10 weeks, I slowly learned my way around the newsroom and vastly improved my ability to report science news.

As an AAAS fellow at the *L.A. Times*, I was given a unique opportunity for hands-on training that few scientists ever get to experience. Placed alongside other interns with graduate degrees in journalism and internships at smaller papers under their belts, I received an assignment on my first day, and didn't stop writing for the rest of the summer.

The fast pace of newspaper writing was like a roller coaster ride in contrast to the months and years it takes to publish a scientific paper. Within my first few weeks, I wrote my first "daily" story, which meant doing the background research, interviews, writing, and editing for the article all in one day.

I also ventured out to the local science community, interviewing scientists at UCLA and Caltech that I probably wouldn't have been able to talk to as a graduate student, but who were happy to speak with the *L.A. Times*. Also, the title of journalist gave me license to ask the types of "silly" questions I might have kept to myself as a scientist.

Ashley Dunn, the science editor, was very supportive and took time to teach me about the business. Every day at 5:30 PM, he gave me a lesson for the day. Sometimes they were "1-hour" lessons ("get your byline right!"), or the "20-year" lesson ("figure out how to list things without actually listing them"), or the biggest, the LIFE lesson ("the most important quality in a reporter is to be able to take care of themselves"). He also took me to several daily meetings, to see how the news is selected and shaped throughout the day.

One of the high points of my fellowship was making the front page on a story about a placebo-controlled surgery trial for knee arthroscopy. It was a controversial story and a little overwhelming to report, but I pulled through. For me, one of the most fascinating aspects of the story was the differences between what I found most intriguing, the experimental design of a placebo-controlled surgery trial, and what the more senior journalists

wanted to emphasize, the downfall of a multimillion dollar industry.

This story highlighted a certain level of tension that exists between the identity of scientist and that of reporter. As scientists, we are trained to make careful statements that reflect the data we have. Journalists are more likely to make strong definitive claims about the impact of this work on the world. This was one area where my editor and I often didn't see eye to eye.

My internship also underscored the difficulty of portraying the incremental nature of science in a way that still reflects its significance. Not every study can have a landmark discovery, so the challenge of the science writer is to portray the work accurately, but also interestingly. And to inform the public on how the scientific research fits into their world. I hope I'll learn how to balance these roles as I continue on the science writing path.

The AAAS Mass Media Fellowship is an incredible program that gives students an opportunity they would not otherwise get. Any scientists would benefit from the experience, whether they plan on pursuing a career in science writing or choose to stay in the lab. ❖

"Science in the Media" - An EB 2003 Symposium

Mapping the genome, hypertension, heart disease—the list of recent news stories written on science-based issues goes on and on. These articles are part of a growing niche in the media for science and health news. Journalists are eager to report on new research in the life sciences. Many reporters have a moderate knowledge of the sciences and some even have subscriptions to scientific journals. They are becoming more receptive to scientific information, especially that which affects human health and personal quality of life. A growing number of reporters have become proactive in their approach, contacting scientists to explore new research on the horizon.

What does this mean to APS members? This ever-growing interest in scientific news is an opportunity to assist in public understanding of and garner public support for scientific and biomedical research. Not only are there many more occasions to publicize scientific studies, but there is also a higher probability that scientists will be called upon by the media to explain these studies. Helping APS membership to take advantage of these opportunities is the aim of the Communications Symposium at EB 2003.

The symposium, entitled "Science in the Media," will feature a panel of three journalists giving their insight into what makes science news and contributing best practices for getting your research covered. The symposium will also feature a hands-on session, with medical publicist Donna Krupa, discussing how scientists can work with the media. This will take the form of a mini-workshop where participants can engage in practical exercises.

The goal of this symposium is to familiarize scientists with how the media works. By preparing scientists to sculpt clear, media-ready messages, the scientific community assists in bringing accurate information to the public. The symposium is open to all members and will be held on Friday, April 11, 2003 from 2-4 PM in San Diego, CA. ❖

APS to Sponsor 2003 Mass Media Fellowship

For the fifth consecutive year, APS will sponsor an American Association for the Advancement of Science (AAAS) Mass Media Science and Engineering Fellow for summer 2003. Applications are due to the AAAS by **January 15, 2003**.

The APS-sponsored fellow will be one of approximately two dozen AAAS Mass Media fellows who will spend 10 weeks during the summer working in the newsrooms of newspapers, magazines, Internet news outlets, or radio or television stations. Fellows will receive a short training course in science journalism prior to the fellowship, and will spend the summer developing their ability to communicate complex scientific issues to non-scientists and improving public understanding of science. The AAAS arranges placements at participating media outlets as part of the selection process. The fellowship includes travel to Washington for orientation and evaluation sessions at the beginning and end of the summer, as well as travel to the job site and a weekly stipend based upon local cost of living.

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

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

For more information or to receive a copy of the application by mail, contact Stacy Brooks in the APS Communications Office. (Tel.: 301-634-7253; Email: sbrooks@the-aps.org). ❖

Symposium Summary Posted on APS Web Site

A summary of the EB 2002 symposium "Everything You Ever Wanted to Know About the IACUC But Were Afraid to Ask" has been posted to the APS website. The URL is http://www.the-aps.org/pub_affairs/IACUC/index.htm. This symposium was organized by the American Physiological Society's Animal Care and Experimentation Committee with support from the NIH Office of Laboratory Animal Welfare (OLAW). The session was co-sponsored by the American Society for Pharmacology and Experimental Therapeutics (ASPET), American Society for Nutritional Sciences (ASNS), American Association of Immunologists (AAI), American Association of Anatomists (AAA), and the Federation of American Societies for Experimental Biology (FASEB).

The web page includes a summary of the proceedings, links to IACUC resources, and information about a second symposium on the workings of the IACUC that will be presented on Friday, April 11 from 1-5 PM as part of EB 2003 in San Diego.

To learn more about this program and how to register for it, see page 86 of the EB 2003 Call for Abstracts, or click on the link to "Information about IACUC 101 for Scientists at EB 2003" from the URL above. Contact APS Public Affairs Officer Alice Ra'anan at araanan@the-aps.org if you need further assistance. ❖

FASEB Promotes Mentoring Tool

Principle investigators can make use of a new tool to help prepare postdoctoral fellows for research careers: the "Individual Development Plan" or IDP. The FASEB Science Policy Committee recently published a set of guidelines for the development of the IDP to help faculty advisors fulfill their responsibilities as mentors. The FASEB IDP is available online at http://www.faseb.org/opar/ppp/educ/idp.html.

The IDP guidelines are intended to "provide a planning process that identifies both professional development needs and career objectives." It is further intended to "serve as a communication tool between individuals and their mentors," according to the online summary.

For further information, contact Heather Rieff of the FASEB Office of Public Affairs at 301-634-7650. ❖

Sustaining Associate Members

Know Your Sustaining Associate Members

Abbott Laboratories

Abbott Laboratories is one of the world's leading health care companies, dedicated to improving people's lives through the discovery, development, manufacture and marketing of health care products. Abbott invests well over $1 billion in internal research each year. The high productivity of this investment reinforces it as the primary component of the company's growth strategy. Some of Abbott's leading products are Biaxin, Depakote, Lupron, Survanta, Ensure, Similac, ProGibb, Ultane, AxSYM, and Precision QID.

ADInstruments

ADInstruments manufactures a range of computer based data recorders for the life and physical sciences. The Maclab and Powerlab systems, comprising both hardware and software, record and display experimental data in real time, and features fast data manipulation, online computations, convenient file storage and high resolution data presentation. A range of signal conditioners and transducers extends the use of Powerlab into many specialist fields.

Eli Lilly and Company

The Lilly Research Laboratories is dedicated to the advancement of basic scientific research upon which targeted medical breakthroughs may be identified. Eli Lilly and Company is committed to excellence in research as evidenced by a steadily increasing investment in novel "cutting edge" research methods and technology (e.g., genomics, combinatorial chemistry, and high volume screening) as they can be applied to drug discovery. Lilly scientists are focusing on basic research and targeted medical therapy for infectious diseases, cardiovascular disease, cancer, central nervous system disorders, and endocrine diseases, with an emphasis on obesity, diabetes, and osteoporosis.

The Gatorade Sports Science Institute

Expertise in sports nutrition and exercise sciences is one of the unique and distinguishing attributes of The Gatorade Company. To further this expertise, the Gatorade Sports Science Institute was founded in the mid-1980's to fully explore the role of fluid homeostasis and nutrient metabolism in exercise performance. Scientific research is conducted at the Gatorade Sports Science Institute and in cooperation with university researchers around the world. Gatorade employs exercise scientists who specialize in exercise physiology, biochemistry, and nutrition research. (Gatorade thirst quencher is the world leader in the sports drink category, and is made by The Gatorade Company, a wholly owned subsidiary of The Quaker Oats Company.)

Merck & Co., Inc.

Merck & Co., Inc. is a worldwide, research-intensive company that discovers, develops, produces, and markets a broad range of human and animal health products and services. Merck's product portfolio includes the cardiovascular drugs VASOTEC and PRINIVIL, and the cholesterol lowering drugs MEVACOR and ZOCOR, the gastrointestinal drug PEPCID, and for symptomatic benign prostate enlargement PROSCAR. Merck has recently introduced the antihypertensive drugs COZAAR and HYZAAR, the anti-glaucoma drug TRUSOPT, the HIV protease inhibitor CRIXIVAN for AIDS, the vaccines VARIVAX (protection against chickenpox and VAQTA (protection against hepatitis A), the osteoporosis drug FOSAMAX, and the over-the-counter antacid PEPCID AC.

Procter & Gamble Company

Procter & Gamble is a multinational, consumer products and health care company committed to world-class research and product development. It has major technical centers in Cincinnati, OH; Norwich, NY; Hunt Valley, MD; Mexico City; Caracas, Venezuela; Brussels, Belgium; Egham and Newcastle, England; and Kobe, Japan.

The worldwide PhD population of P&G is over 1,200, divided about equally between life scientists and chemists; total employees number 100,000.

Sales in health care/pharmaceuticals, beauty care, cosmetics and fragrances, food and beverage, laundry and cleaning, and paper products make P&G one of the largest companies in the US. *Fortune* magazine consistently recognizes P&G as one of the "Most Admired US Corporations."

Rhône-Poulenc Rorer

Rhône-Poulenc Rorer is an international company dedicated to health. RPR is the first pharmaceutical company in France, the third in Europe, with a turnover in 1994 of $4.5 billion: a research driven company with 14% reinvested in Research and Development ant 3,000 employees in R&D.

With Research Centers located in France, USA and UK, Research & Development is focused on seven main therapeutic areas: oncology, cardiovascular diseases, infectious diseases/AIDS, rheumatology/bone metabolism, central nervous system disorders, respiratory diseases/allergies, plasma proteins.

To invest in new technologies, gene and cell therapies, is the RPR's commitment to the future.

G.D. Searle & Company

The physiologic and scientific directions of Searle are primarily in areas related to arthritis and inflammation, cardiovascular disease and oncology, with an emphasis on adjunctive therapy and opportunistic infections. In these three major therapeutic areas, the emphasis is on defining new molecular targets that are likely to elicit a dramatic shift in therapeutic efficacy with a true ultimate enhancement of therapeutic benefit. Research employs high throughput robotic screening to define chemical or protein leads, medicinal chemistry and protein biochemistry including protein mutagenesis, to maximize the properties of the chemical or protein lead and extensive animal testing to determine proof of concept. Molecular and cell biology are utilized extensively to support screening efforts and to define the molecular targets underlying a particular disease, including the use of differential display PCR. The approach is to integrate expertise across scientific disciplines to rapidly determine proof of concept underlying a disease target.

FULL PAGE AD

Pavlov's Physiology Factory: Experiment, Interpretation, Laboratory Enterprise

Daniel P. Todes.
Baltimore, MD: The Johns Hopkins Univ. Press, 2001, 504 pp., illus., index, $58. ISBN: 0-8018-6690-1.

Prince Ol'denburgskii, a philanthropic member of the Russian royal family, conceived, built, organized, staffed, and supervised the Imperial Institute of Medical Research in St. Petersburg. When the Institute opened in 1891, the Prince appointed Ivan Pavlov, a scientific nonentity at the time, director of the Division of Physiology because no more suitable candidate was available. Pavlov was awarded the Nobel Prize in Physiology or Medicine in 1904. Daniel Todes chose not to integrate an account of Pavlov's scientific work and its social and intellectual context with his ongoing biography of Pavlov. Instead, he has written this free-standing book. Todes has mined every pertinent Russian archive, and he has consulted French, German, English, and Scandinavian sources. He has produced a splendid example of the historiography of science.

Pavlov had a large staff: senior assistants, students, laboratory technicians, and the men who cared for the hundreds of dogs used as subjects in research. The Russian government, in an effort to improve the quality of its medical corps, gave physicians leave for two years to work in scientific laboratories where they would earn the MD degree. As many as 23 at a time worked in Pavlov's laboratory. They had no scientific training, but they were closely supervised by Pavlov. The dissertations they submitted for the degree were revised and edited by Pavlov, and they often recorded important results.

Pavlov was the director responsible for the operation of a large factory for the production of knowledge claims. Todes' detailed account of labors on the shop floor tells us how the knowledge claims were manufactured.

Pavlov studied gastric, pancreatic, and salivary secretion in that order. From the time of Starling onward, we in the West, who wrote textbook accounts of Pavlov's contributions to the physiology of the digestive tract, had to rely on a few papers in French or German and on the second edition published in 1910 of W. H. Thompson's translation of *Pavlov's Lectures on the Work of the Digestive Glands*. When we read Pavlov's declaration that meat placed directly in the stomach without arousing any extraneous reflexes stimulates acid secretion because its extractives stimulate endings of nerves in the gastric mucosa, we remembered Pavlov's belief that all physiological functions are mediated by nerves. Todes does tell us about Pavlov's reluctant acceptance of humoral control of pancreatic secretion by secretin, but he does tell us about Pavlov's ultimate capitulation to gastrin. Pavlov's Lectures refer to 23 of his students' dissertations in Russian, but the descriptions of the work are too brief to be useful. Todes has read the dissertations, and he uses what he has learned.

Pavlov said the digestive tract is a great chemical factory that performs its operations in a stereotyped and purposive manner. He studied only secretion, and he paid no attention to digestion, motility or absorption. Pavlov showed no sign of interest in E. S. London's massive study of digestion and absorption of foodstuff by fistulous dogs that were being carried out in the Imperial Institute's Laboratory of General Pathology from about 1895. Walter B. Cannon's contemporaneous studies of motility by means of X-rays produced results as important as Pavlov's, but Pavlov apparently did not know about them.

Operations of the gastrointestinal tract's chemical factory are not so stereotyped as Pavlov claimed. In his *Lectures on the Work of the Digestive Glands*, Pavlov published a figure showing the volume rates of pancreatic secretion in a dog in two experiments in which the dog had been fed 600 ml of milk. The curves are so nearly identical that they could easily be superimposed. Todes reports that Pavlov constructed the curves from two out of 32 similar experiments. No curve drawn from the other 30 would be stereotypical. Todes excuses Pavlov by writing that Pavlov " ...was, after all, following [Claude] Bernard's dictum to present one's 'most perfect experiment as a type,' "but Pavlov was disingenuous when he used that figure in a book intended to be read by persons unfamiliar with his laboratory practice."

Daniel Todes' book gives us much to think about, and we should be grateful to him. ❖

H. W. Davenport
Birmingham, AL

Performance Standards and Animal Welfare: Definition, Application and Assessment Parts I and II

Gonder, Smeby, Wolfle
Madison, WI: Omni Press, 2001, 81 pp., $25.00

The book *Performance Standards and Animal Welfare: Definition, Applica-tion and Assessment: Parts I and II* presents a summary of two related conferences sponsored by the Scientists Center for Animal Welfare (SCAW) that were held in June 1997 and May 1998. These conferences focused on an important topic in the development and management of programs for the care and use of research animals. The growing acceptance of performance standards by regulatory and oversight agencies offers greater flexibility to regulated institutions in achieving their research objectives and regulatory mandates in practical ways as compared to the imposition of rigid and perhaps arbitrary engineering standards of practice. However, the implementation of performance standards has perhaps out-paced the dissemination of information regarding how to appropriately develop and validate a performance-based program or activity. Thus, the topic of

these conferences is timely. The book represents a summary of information and perspectives that could be useful to persons involved in program development for the care and use of research animals.

Part I of the book introduces the concept of performance standards with the succinct statement that they "define an outcome in detail and provide criteria for assessing that outcome, but do not limit the methods by which to achieve that outcome." The three broad topic areas of the first conference are then reviewed. First, "Enrichment of the Environment—Benefits to the Animals" focuses on the interpretation of USDA requirements for environmental enrichment of nonhuman primates and exercise for dogs, with the general conclusion that even well-implemented enrichment and/or exercise programs alone may not alleviate behavioral problems exhibited by these species. Next, "Interpreting the Standards" provides an overview of the perspective of the three major animal research oversight agencies—the USDA, OPRR, and AAALAC. The primary emphasis of this section is that although federal regulations and the *Guide for the Care and Use of Laboratory Animals* are performance-oriented, implementation procedures at regulated institutions should be well-defined, perhaps similar to engineering standards, and must have documented effectiveness. The final topic of this conference, "Facilities and Equipment," provides the useful synopsis that establishing performance standards for any process requires four elements: *1*) to set the goal, *2*) to define necessary measurements, *3*) to establish the necessary frequency of measurements, and *4*) to verify that target criteria are met.

Topics for Part II were selected at least in part based on a survey in which Part I participants were asked to identify programs that they had found difficult to develop and oversee using a performance-based approach. "Occupational Health and Safety" was overwhelmingly the primary problem area mentioned. Accordingly, the book devotes considerable discussion to risk assessment and evaluation strategies particularly as applied to allergies, biohazards, and zoonotic disease. Other topics addressed are "Assurance of Performance Standards at Multiple Sites," "Surgery and Postoperative Care," "Animal Welfare: Introduction," and "Performance Standards and the Inextricable Link between Colony Management and Behavior Research." Finally, two case reports illustrate the use of performance-based methods to investigate the acceptability of extending cage changing intervals and increasing the caging density for mice.

The book is primarily example-driven rather than prescriptive, and the text presents many useful and interesting examples of concepts that may be rather mysterious to those who are regulated under the "performance standard" rubric. The book is, therefore, perhaps a useful introduction to these topics. The narrative style of writing makes the book quite easy to read, although in several places the text seems somewhat rambling and poorly organized. The major weakness of the book, however, is the lack of references. This reader was continually intrigued by some statements but then frustrated by the absence of a reference that could provide additional information or documentation. Although the book offers some useful opinions, the absence of appropriate references severely limits the potential value of the book as a data resource. In addition, the book was not indexed, which also greatly reduces its utility as a resource by making it very difficult for readers to locate topics of interest within the body of the text. A more satisfactory approach to presenting this information might have been to compile a series of chapters written and referenced by the conference participants, as SCAW has published in the past. ❖

Linda A. Toth
Southern Illinois University

Books Received

Cells, Gels and the Engines of Life: A New, Unifying Approach to Cell Function
Gerald H. Pollack.
Seattle, WA: Ebner & Sons Publishers, 2001, 305 pp., illus., index, $27.95.
0-9626895-2-1.

Cortical Areas: Unity and Diversity
Almut Schuz and Robert Miller (Editors).
London, England: Taylor & Francis, 520 pp., illus., index, $95.00.
ISBN: 0-415-27723-X.

Degeneration and Regeneration in the Nervous System.
Norman R. Saunders and Katarzyna M. Dziegielewska (Editors)
Amsterdam, The Netherlands: Harwood Academic, 2000, 330 pp., illus., index, $39.00.
ISBN: 90-5823-022-8.

Human Growth and Development
Noel Cameron.
San Diego, CA: Academic, 2002, 434 pp., illus., index, $79.95.
ISBN: 0-12-156651-X.

Physiological Aspects of Sport Training and Performance
Jay Hoffman.
Champaign, IL: Human Kinetics, 2002, 344 pp., illus., index, $49.00.
ISBN: D-7360-3424-2.

Sensorimotor Control of Movement and Posture
Simon C. Gandevia, Uwe Proske, and Douglas G. Stuart
Kluwer Acedemic/Plenum, 2002, 518 pp., illus., index, $140.00.
ISBN: 0-306-47285-6.

Sex Differences in Lateralization in the Animal Brain
V. L. Bianki and E.B. Filippova.
Tatiana A. Ganf (Russian Translator).
Robert Miller (Editor).
Amsterdam, The Netherlands: Harwood Academic, 2000, 209 pp., index, $120.00
ISBN: 90-5823-088-0.

Time and the Brain
Robert Miller (Editor).
Amsterdam, The Netherlands: Harwood Academic, 2000. 417 pp., illus., index, $73.00.
ISBN: 90-5823-060-0.

Postdoctoral Positions

Postdoctoral Position: A postdoctoral position is available in a NIH-funded laboratory conducting research in the area of human genomics. The main focus of the laboratory is in studying segmental duplications on human chromosomes with respect to their evolution as well as their effect on chomosomal instability. The position offered requires an individual who has recently obtained a PhD (0-2 years experience) or its equivalent with a strong background in molecular biology. Experience with techniques in DNA and RNA manipulation which include PCR, southern and northern hybridizations, genomic library construction, etc. are highly desirable. A major portion of the research will involve computer-based analysis of nucleotide sequence data and bioinformatics. Experience with web-based as well as other software tools for sequence data analysis will be a plus. The Children's Hospital of Philadelphia offers competitive salaries, comprehensive medical/vision/dental/prescription plans, life insurance, employer contribution retirement plan, work/life benefits, and a firm commitment to staff development and education. Apply online at http://careers.chop.edu or Fax: 215-590-4644. Use reference ID 41/TS in all correspondence. [EOE]

Postdoctoral Position: A postdoctoral position is available immediately on a NIH-funded project to discover how the hormone angiotensin II (ANG II) directly stimulates the activity of Na, K-ATPase in the rat proximal tubule, a fundamental problem with significant implications for understanding normal kidney function, as well as the development of hypertension and heart failure. The applicant will be expected to design, conduct and analyze experiments using techniques in biochemistry, cell biology, molecular biology, and optical imaging to address the specific aims of the project: *1*) determine the regulatory sites of phosphorylation on the Na, K-ATPase through which ANG II controls activity and to identify new phosphorylation sites; *2*) determine to what extent ANG II stimulates Na, K-ATPase activity by altering its kinetic properties compared to its rapid recruitment to the plasma membrane. Interested applicants should submit a current CV, a brief statement of research interests and career goals, and names and addresses of three references to Dr. Douglas Yingst, Department of Physiology, Wayne State School of Medicine, 540 E. Canfield Ave., Detroit, MI 48201, USA; dyingst@med.wayne.edu. This project is being carried out in collaboration with Dr. Mattingly in the Department of Pharmacology and Drs. Rossi and Mohanty of the Division of Nephrology in the Department of Internal Medicine. Women and minorities are encouraged to apply.

Postdoctoral Position: Available immediately for recent PhD with primary interest in neural control of the circulation. The position offers the interested individual an opportunity to learn surgical techniques for large animals, including chronic instrumentation to assess cardiovascular and endocrine status and preparation of models of hypertension. Current research in the lab is supported by an NIH grant and is focused on the role of baroreceptors in the long-term control of blood pressure. Interested candidates should send a current CV, a statement of research interests and career goals, and names and addresses of three references to Terry Thrasher, PhD, Department of Surgery, University of Maryland, 10 South Pine St., Room 400, Baltimore, MD 21201; Tel: 410-706-7044; Email: tthrasher@smail.umaryland.edu.

Postdoctoral Position, Gene Therapy: Postdoctoral position available in molecular biology and immunology of viral gene transfer for treatment of genetic disease. Project is based on in vivo gene transfer using adeno-associated viral (AAV) vectors for expression of secreted gene products such as coagulation factor IX for treatment of hemophilia B (*Nat Med* 5: 56-63, *Mol Ther* 1: 225-235, *Blood* 99: 2670-2676). The project involves transgenic and knockout mice, and employs techniques in the areas of molecular biology, virology, and immunology (with particular emphasis on T cell biology). Requirements include recent MD or PhD and strong background in molecular biology or immunology. Please send or Email CV, two letters of reference, and contact information for references to Roland W. Herzog, The Children's Hospital of Philadelphia, Abramson Research Center 310, 34th St. and Civic Center Blvd., Philadelphia, PA 19104; Email: rwherzog@mail.med.upenn.edu.

Postdoctoral Position: A postdoctoral position is available to investigate the enzymology and physical biochemistry of the membrane-dependent proteolytic reactions of blood coagulation. The major areas of interest in the laboratory relate to the specificity and function of the enzyme complex (prothrombinase) that catalyses thrombin formation and the regulation of the initiation of coagulation by the extrinsic Xase complex. A principal focus in the laboratory is to resolve the contributions of discrete macromolecular interactions to enzyme assembly and function. The successful candidate is expected to have a PhD in Biochemistry or related discipline with a strong interest in protein chemistry, enzymology, physical biochemistry and/or macromolecular interactions. Those interested should send a CV with contact information for three references to: S. Krishnaswamy, Joseph Stokes Research Institute, The Children's Hospital of Philadelphia and the University of Pennsylvania, 302F Abramson, 3516 Civic Center Boulevard, Philadelphia, PA 19104. Tel: 215-590-3346; Fax: 215-590-2320; Email: krishna@mail.med.upenn.edu.

Postdoctoral Position: La Jolla Bioengineering Institute has two positions available to study mechanochemical signal transduction. Em-

phasis will be on membrane mechanics and the role of G proteins in transducing fluid flow-induced signals using transgenic in vitro and in vivo models. Candidates should have a PhD in relevant area of physiology, biochemistry, cell biology, biophysics, chemical engineering or bioengineering. Interested candidates should send a current CV, and names and addresses of three references to: Dr. John A. Frangos, La Jolla Bioengineering Institute, 505 Coast Boulevard South, La Jolla, CA 92037 or apply online at: http://www.ljbi.org; Fax: 858-456-7540.

Postdoctoral Fellowship: A postdoctoral fellowship position funded by the NIH is available to study the central regulation of the cardiovascular system. The research is focused on the neuroanatomy, neuropharmacology and convergence of central pathways mediating sympathoinhibition under different conditions. The studies will utilize electrophysiological techniques including extracellular central unit and peripheral nerve recordings combined with microinjection techniques and immuno-histochemistry. Experience in small animal surgery and brain neuroanatomy preferred. Send CV and brief summary of research interests to C. Dean, PhD, Department of Anesthesiology-151, Medical College of Wisconsin, VA Medical Center, 5000 W. National Ave., Milwaukee WI 53295; Email: cdean@mcw.edu.

Postdoctoral Fellowship: Consistently ranked as one of the best pediatric hospitals in the nation by *US News & World Report*, The Children's Hospital of Philadelphia is offering a Postdoctoral Fellowship in its Pediatric Cardiology division. Working along with the University of Pennsylvania, this is an opportunity to study molecular genetic mechanisms in cardiac development. The lab's main projects focus on cardiac mesoderm induction, heart looping, and cardial cell proliferation. Possible projects include investigating novel signaling mechanisms and genes in heart development, and TGFf-signaling. Our ideal candidate will possess training in molecular embryology of heart development using Xenopus and mouse model systems. Experience in molecular biology, protein and nuclei acid biochemistry, signal transduction, and vertebrate embryonic development is helpful. All strong candidates will be considered. The Children's Hospital of Philadelphia offers total compensation packages that include competitive salary and excellent benefits. Please send a curriculum vitae, summary of research interests and the names of three references to: Kenneth Ryan, PhD, The Children's Hospital of Philadelphia, Abramson Pediatric Research Center-710, 3615 Civic Center Blvd., Philadelphia, PA 19104; Fax: 215-590-5454; Email: ryank@email.chop.edu. You may also apply online at http://careers.chop.edu. Use reference ID 41 in your correspondence. [AA/EEO]

Postdoctoral Fellow: Join one of the best pediatric hospitals in the nation, as cited by *US News and World Report* and *Child Magazine*. The Children's Hospital of Philadelphia has an immediate opportunity available for a Postdoctoral Fellow to work in its Psychiatry area. In this position, you will perform routine, specialized and unique laboratory tests, specimen preparations, and experimental procedures for research studies, gaining the basic understanding of scientific research. A PhD in Psychology or related scientific field is necessary; 3-5 years experience in psychotherapy research is preferred. You should also be able to work independently, and possess excellent writing, communications and organizational skills. The Children's Hospital of Philadelphia offers an excellent compensation package, including salary, benefits, tuition reimbursement and parking/transit discounts. Apply online at http://careers.chop.edu or Fax your resume to 215-590-3184. Use reference ID 17 in your correspondence. You may also Email your credentials directly to schaaf@email.chop.edu. [EOE]

Postdoctoral Fellow: We are seeking a postdoctoral fellow in our Hematology Department. Projects include development of novel gene transfer vectors based on AAV (adeno-associated virus), molecular biology of AAV (adeno-associated virus)-mediated gene transfer to muscle and liver, and characterization of novel (transgenic/knock-out) mouse models for gene transfer in hemophilia. Candidates with MD or PhD and 0-1 year of postdoctoral experience should apply. Requirements include a strong molecular biology or medical science background. Tissue culture and/or small-animal experience is useful. Applicants please send curriculum vitae (including Email and references) and two letters of reference to Dr. Weidong Xiao, Children's Hospital of Philadelphia, Abramson Research Center, 302, 34th Street and Civic Center Blvd., Philadelphia, PA 19104; Fax: 215-590-3660; Email: xiao@email.chop.edu.

Postdoctoral Research Positions: Two postdoctoral positions are available immediately for research on the microcirculation. One position will study the rheological properties of blood in the microcirculation using high-speed video microscopy, fluorescence imaging, and image analysis techniques. Studies will focus on flow properties in arterioles and venules and the effect of normal levels of red cell aggregation as well as elevated levels seen in disease states in humans. A second position will examine microcirculatory responses in an animal model of sleep apnea—a clinical condition implicated in hypertension and heart failure. The studies employ video microscopy and phosphorescence dye techniques to examine short and long term effects on arterioles and oxygen levels in the microcirculation with intermittent hypoxia. Candidates with a PhD, MD or equivalent and background in physiology or engineering are invited to apply. Please submit a CV and names of three references to: Paul C. Johnson, PhD, Dept of Bioengineering, University of California, San Diego,

La Jolla, CA, 92093-0412; Email: pjohnson@bioeng.ucsd.edu.

Postdoctoral Research Fellow: As a postdoctoral research fellow, you will work in the Division of Human Genetics and Molecular Biology. The focus of the research in the laboratory is on the genes involved in several pediatric diseases, birth defects and comparative genomics. Some laboratory research experience is required. The position requires a PhD in Biology, Chemistry, or related. Knowledge of molecular biology techniques that may include DNA and RNA manipulation, PCR, Southern hybridization, etc. or techniques in cytogenetics and fluorescence in situ hybridization (FISH) are desirable. We offer competitive compensation packages, medical, vision, dental and life insurance, discounts on public transportation and employee parking, tuition assistance, training and staff development, generous paid time off, employer contribution retirement plan and work/life benefits. Apply online at http://careers.chop.edu or Fax: 215-590-4644. Use reference ID 41/BE in your correspondence. [EOE]

Research Positions

Research Faculty and Postdoctoral Research Associate Positions: Research track faculty and postdoctoral positions available to investigate *1*) signal transduction and molecular control of microvascular barrier function in inflammation and burns; *2*) leukocyte-endothelium interaction and endothelial cell-cell and cell-matrix adhesion; and *3*) gene regulation and molecular therapy of diabetic cardiovascular complications. State-of-the-art techniques are routinely used in the lab, including fluorescence confocal microscopy, intravital microscopy, isolation and perfusion of microvessels, DNA/protein transfection, real time RT-PCR, and cDNA/protein microarray analysis of gene profiles and protein-protein interactions. Applicants must have a doctoral degree in related areas. Experience in molecular cell biology or vascular biology is preferred. Research Faculty applicants must have previous postdoctoral experience and publications in related journals. Salaries for positions may be negotiable and are based on qualifications and experience. Faculty applicants send CV and names of three references to: Dr. Sarah Yuan, Department of Surgery, Texas A&M Univ. Health Science Center, 702 Southwest HK Dodgen Loop, Temple, TX 76504; Email: yuan@tamu.edu. Postdoctoral applicants apply for job number 021613 online at TAMUjobs.tamu.edu. [EEO/AA].

Research Investigator: University of Iowa's College of Medicine, Department of Internal Medicine, Division of Rheumatology, is seeking a Research Investigator to perform basic research in human immunology with responsibility primarily for the completeness and adequacy of the research work. Requires a person in this classification has the academic knowledge of a discipline generally associated with the equivalent of a Doctoral degree, or has completed all the requirements for receipt of such a degree. Desires experience with cellular immunology techniques, particularly those relating to T cells, molecular biological techniques, biochemical techniques, and cell culture. Desires good analytical, quantitative, and organizational skills. Please send resume and cover letter indicating #44656 to: Carol Wehby, Human Resources, Internal Medicine, The University of Iowa, E400 GH, 200 Hawkins Drive, Iowa City, IA, 52242-1081. [EEO/AA] Women and minorities are strongly encouraged to apply.

Research Scientist: Lung Biology Laboratory, Departments of Medicine, Pediatrics, and Physiology, Georgetown University School of Medicine, Washington, DC seeks a Research Scientist at the doctoral level to join a group of full-time investigators working on regeneration of the lung's gas exchange units. See *Nat. Med*. 3:675, 1997; *Am. J. Physiol*. 278:L955, 2000; *Physiol. Genomics* 4:51, 2000; *Am. J. Physiol*. 283:L305, 2002; FORTE: NHLBI-NIH Clinical Trials Data Base. Position requires a person experienced in cell biology (cell and organ culture, in situ hybridization, immunolocalization) and molecular biology. Please send, via Email, a CV, bibliography, statement of long-term goals, and names and Email addresses of three individuals for whom you worked, to Donald Massaro, massarod@georgetown.edu.

Research Associate/Scientist: We are seeking a Research Associate/Scientist for the Division of Neonatology at Mount Sinai Medical Center, Miami Beach FL. The research focus is directed towards the mechanisms leading to hemodynamic changes resulting from periodic acceleration and the associated production of vasoactive substances. The candidate must have a strong background in cardiopulmonary physiology, and a biochemistry background is desirable. Small and large animal surgical skills are required. The candidate must have experience in hemodynamic measurements, biochemical techniques and data analysis. Excellent writing skills are a necessity. Candidates with MD, PhD, or DVM will be given preference. However, individuals with a Master's Degree with significant training will also be considered. Salary is commensurate with experience. Contact: Jose A. Adams, MD at TONY@MSMC.COM or Fax 305-674-2306.

Research Technician–Neurobiology: The Joseph Stokes Jr. Research Institute, part of The Children's Hospital of Philadelphia, has an opportunity to work with the latest technologies and leading personnel. We have approximately 400,000 square feet of research space, with funds for additional research space construction committed, and currently receive approximately $65,000,000/year in extramural support. Many historical breakthroughs from Stokes have

made Children's Hospital an international pioneer in pediatric medicine. We have an immediate availability for Research Technician II in Division of Stress Neurobiology. The Technician would be under the direct supervision of two PhD primary investigators. Responsibilities would include conducting neuroscience research, including immunohistochemical and anatomical processing of brain tissue, computer analysis of processed tissue including morphological mapping, behavioral techniques, surgical techniques, electrophysiological recording and some clerical responsibilities. Qualifications: At least a bachelor's degree with previous experience or training in biology, psychology, chemistry, anatomy, and/or physiology. Some artistic talent would also be advantageous. The Technician would be an integral part of the Division of Stress Neurobiology that is comprised of a group of research scientists including primary investigators, postdoctoral fellows, clinical fellows, graduate students and research technicians. You may apply online at http://careers.chop.edu or Fax your resume to E. Mayo at 215-590-4644. Use reference ID 57. We offer competitive compensation packages; medical, vision, prescription, dental, and life insurance; tuition assistance; training and staff development; generous paid time off; an employer contribution retirement plan; and work/life benefits.

Senior In Vivo Specialists: The Merck Frosst Centre for Therapeutic Research has achieved unparalleled success in the pharmaceutical industry as a result of our unwavering commitment to basic research. A list of MFCTR scientific publications can be viewed on our web site. The Senior In Vivo Specialists we seek will participate in drug discovery programs at our state-of-the-art research facilities in Montréal, Québec, Canada. They will have the opportunity to participate in one of our ongoing programs in the areas of respiratory diseases and inflammation, endocrine disorders, bone diseases, or CNS biology. Applicants may be drawn from disciplines that include, but are not limited to, Pharmacology, Physiology, Medicine or Veterinary Medicine, but must have significant expertise in in vivo techniques. Candidates should have postdoctoral experience, a superior record of accomplishment in biomedical research as evidenced by a strong publication record, and excellent communication skills. We seek individuals who share our core research values and vision in the development of innovative medicines for the treatment of diseases. Merck Frosst is always interested in world-class scientists who wish to apply their talents to build on our legacy of therapeutic success. Our salaries, benefits and growth potential are excellent. Applicants interested should send electronic versions of their CV (including names and addresses of three potential references) and a statement describing their research interests to Christian Riel, merck-frosstlab@merck.com, **before Wednesday, October 16, 2002**. Please reference ad MRL-20 in the subject line. [EEO]

Faculty Positions

Assistant/Associate/Full Professor, Physiology: The Department of Physiology at Jefferson Medical College seeks applicants for full-time faculty at all levels. Candidates should have an active research program addressing fundamental problems in cardiovascular biology, an area targeted for multidisciplinary development at Jefferson. Areas of special interest are muscle physiology, ion channels, second messenger systems, and microcirculation. Successful candidates will receive an academic tenure track appointment and be expected to contribute to teaching of both medical and graduate students. Candidates must hold a doctoral degree, have a minimum of two years postdoctoral experience (for Assistant Professor level), and show strong evidence of being able to generate funding for an independent research program. Send curriculum vitae, a brief description of research interests, and the names, telephone numbers, and Email addresses of three references to: Marion J. Siegman, PhD, Chair, Department of Physiology, Jefferson Medical College, 1020 Locust Street, Philadelphia, PA 19107.

Assistant Professor: The Department of Zoology at the University of Hawaii invites animal physiologists whose research interests integrate with existing departmental strengths in ecology, evolution, and developmental biology to apply for a tenure-track Assistant Professor position. Teaching responsibilities will include an advanced undergraduate course in animal physiology and a graduate course in the individual's specialty. Applicants must have a PhD in a relevant area of the biological sciences, evidence of significant research accomplishments, and a commitment to teaching. To apply send letter of application, curriculum vitae, statement of research accomplishments and goals, and the names, addresses, and Email contacts of three references to: Search Committee, Department of Zoology, 2538 McCarthy Mall; University of Hawaii, Honolulu, HI 96822. Inquiries should be directed to zoology@hawaii.edu. Closing date: To receive full consideration applications must be received by **October 1, 2002**. However, review of applications will continue until the position is filled. [EEO/AA]

Assistant/Associate Professor, Signal Transduction: The Cleveland Clinic Foundation has a position to complement existing research programs in cardiac, vascular and neuronal function. Expertise in cell and molecular biology techniques to investigate excitation-response signaling is required. Join a growing research program in the Division of Anesthesiology and Critical Care Medicine utilizing in vivo, in vitro and molecular techniques to address fundamental research issues. Numerous collaborative opportunities with clinical depart-

ments and the Lerner Research Institute. Competitive salary and start-up funds. Visit http://ccfanes.estco.net/anesthesia/Research for more information. Candidates should send CV, name and Fax number of three references, and a brief statement of research interests to: Dr. Paul A. Murray, Carl E. Wasmuth Endowed Chair and Director, Center for Anesthesiology Research–FF40, The Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, OH 44195. The Cleveland Clinic Foundation is an Affirmative Action/Equal Opportunity Employer.

Faculty Position-Professor and Chair: The Department of Nutritional Sciences at the University of Wisconsin-Madison invites applications for a 12-month position at the tenured Associate or Full Professor level to serve as Department Chair and Director of the Interdepartmental Graduate Program in Nutritional Sciences (IGPNS). We seek prominent candidates with a PhD in nutrition, biochemistry or a related discipline and whose personal and professional experience and attributes assure outstanding leadership in teaching, research and extension programs. UW-Madison has a tradition of strong faculty governance. The successful candidate is expected to maintain teaching and research efforts appropriate to the balance of his/her duties. Candidate must have a sustained record of publications and peer-reviewed research funding, and a record of scholarly achievement that merits tenure at UW-Madison. Research efforts of the successful candidate will ideally include biochemical and molecular approaches to study some aspect of nutrient metabolism or metabolic regulation. The Chair will play the key role in promoting the development of new research directions and efforts of the Department and the IGPNS that will keep them at the forefront of national research efforts in Nutrition. This would include promoting molecular and genetic approaches that are aimed at basic and clinical research problems that have a clear nutritional component and are directly relevant to vertebrates. Information about our department and graduate program can be viewed at http://www.nutrisci.wisc.edu. The campus offers access to interdisciplinary graduate student programs in Cell and Molecular Biology, Genetics, Environmental Toxicology, and Aging. Our recently renovated building includes spacious labs, animal facilities, and equipment for performing modern molecular, cellular or genetic research. Campus wide facilities include a biotechnology center, a transgenic animal facility, advanced microscopy facilities, mass spectrometric facilities for metabolites and protein work, a national NMR facility, animal environmental chambers, and a General Clinical Research Center with a metabolic chamber. Send a cover letter describing your interests in and qualifications for this position, a CV, a statement of research interests, and three letters of reference to: Rick Eisenstein PhD, University of Wisconsin, Department of Nutritional Sciences, 1415 Linden Drive, Madison, WI 53706. Respond on or before **November 25, 2002** to ensure full consideration but later applications may be reviewed should the initial review not identify a sufficient number of candidates. Unless confidentiality is requested in writing, information regarding the applicants must be released upon request. Finalist cannot be guaranteed confidentiality. PVL # 42756. [EEO/AA]

Faculty Positions: Two faculty positions are available beginning with the 2003-04 academic year. First, a tenure-track position in physiology; teaching responsibilities include human physiology and comparative animal or vertebrate physiology, with some combination of nutrition or general biology for non-majors. Second, a three-year position (with possibility of renewal or conversion to tenure-track status) in developmental biology; teaching responsibilities include developmental biology, with some combination of cell biology, genetics, or general biology for non-majors. PhD preferred but ABD also considered for both positions. A commitment to undergraduate teaching in a liberal arts setting is required; participation in undergraduate research is encouraged. Augustana is a private liberal arts college affiliated with the Evangelical Lutheran Church in America. Augustana is an EOE and encourages applications from women and minorities. Send a letter of application (indicate position title), curriculum vitae, graduate transcripts, statements of teaching and research philosophy and three letters of recommendation (include work telephone number and/or Email address of evaluators) to Dr. Richard Jurasek, Dean of the College, Augustana College, 639 - 38th Street, Rock Island, IL, 61201-2296. Application deadline: **October 15th, 2002.** Visit us at http://www.augustana.edu.

Assistant/Associate Professor of Physiology: The position requires teaching, research, and service to the college. Preference will be given to individuals with expertise in neurophysiology or endocrine physiology, but all strong candidates will be considered. The Lake Erie College of Osteopathic Medicine (LECOM) is a private, non-profit medical school and a newly established school of pharmacy (http://www.lecom.edu). Please send a curriculum vitae, a brief summary of research and teaching interests, and the names and addresses of three references to: Philip B. Hultgren, PhD, LECOM, 1858 West Grandview Blvd., Erie, PA 16509; Email: phultgren@lecom.edu; Fax: 814-866-8411. Application deadline: **December 1, 2002**.

Government Position

Health Scientist Administrator: (Biological Sciences). Announcement Number: NIDDK-02-0263. The incumbent of this position within the Kidney, Urology and Hematology Division provides scientific guidance, direction and management for a basic research portfolio of grants related to functions of the kidney and urinary systems, including grants related to

epithelial transport and organ physiology. The incumbent is expected to bring expertise in physiology, molecular biology and/or cell biology to management of this portfolio. The incumbent will be expected to develop and encourage innovative applications that use modern molecular and functional methods and genomic information to study the pathogenesis, treatment and prevention of disease of the kidney and urinary system. As Program Director in the basic science of kidney and urologic disease, the incumbent formulates specific extramural program goals and evaluates results in achieving the fundamental objectives of the program. Responsibilities include providing technical advice to grantees on programmatic, scientific, and/or technical issues, counseling applicants on resubmissions, interacting with advisory groups, boards, and lay organizations in development of scientific meetings and planning groups for future initiatives; acting as project officer on awarded contracts; and conducting on-site field visits to research institutions. **Basic Qualification Requirements:** Candidates must meet qualifications and time-in-grade requirements within 30 days from the closing date of this vacancy announcement. Applicants must be US Citizens and must meet the requirements described below: Successful completion of all requirements for a PhD (or equivalent doctoral degree), in an accredited college or university, including acceptance of the dissertation, in an academic field of health or pertinent sciences (i.e., physiology, cell biology, pharmacology, biochemistry) allied to health or health-related research; or successful completion of a full four-year course of study in an accredited college or university, leading to a bachelor's or higher degree, with major study in an academic field of health or pertinent sciences which have been applied and utilized by the applicant in health or health-related research and, in addition, at least one year of qualifying progressively responsible experience; or any equivalent combination of graduate study and research experience in these fields. Applicants must demonstrate that they have *1*) worked independently in planning, organizing, and conducting biomedical, behavioral health or health-related research; *2*) served effectively in research program administration in these fields; and *3*) acquired an understanding of the history, interests, internal dynamics, and relationships of organizations in which health research is conducted.
For more information contact National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) Division of Kidney, Urologic, and Hematologic Diseases (DKUHD) Attention: Deirdre Davis, (NIDDK-02-0263), National Institutes of Health, NIDDK Human Resources Office, 6707 Democracy Blvd., Suite 700N, MSC 5451, Bethesda, MD 20892-5451; Email: Davisd@extra.niddk.nih.gov; Tel: 301-496-4231; Fax: 301-402-3951. ❖

Advertise your job vacancy to over 11,000 members and subscribers!

Ads are accepted for either positions available or positions wanted under all categories. The charge is only $75. All ads are also posted on the APS Career Opportunity Web page immediately upon receipt until the deadline has past.

If you would like to have your ad listed in The Physiologist or on the APS Career Opportunities Web page (http://www.the-aps.org/careers/car_pos_avail.htm), the following items are needed: a copy of the ad, the name of a contact person, and either a purchase order number, credit card number (with expiration date and name of cardholder) or billing address. Send the information to Linda Comley (Email: lcomley@the-aps.org; Tel: 301-634-7165; Fax: 301-634-7242).

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Siegman Named Chair of Jefferson's Department of Physiology

APS member **Marion J. Siegman**, professor of physiology at Jefferson Medical College of Thomas Jefferson University in Philadelphia, has been named the chair of Jefferson's Department of Physiology. Siegman, who had previously been acting chair of the department, is the first woman to be named chair of a medical college department at Jefferson. She succeeds former chair Alan Lefer, emeritus professor of physiology at Jefferson Medical College, who retired in 2001.

Siegman, a specialist in smooth muscle physiology, came to Jefferson in 1967 as an instructor in physiology and was quickly promoted to assistant professor the next year. She became an associate professor in 1971 and subsequently, professor in 1977—the first woman to achieve that rank at Jefferson. She was named acting chair of the Department of Physiology in July 2001.

"We're very excited to have Marion Siegman as our new chair of physiology," says Thomas Nasca, Dean of Jefferson Medical College. "Her long and distinguished research and teaching career at Jefferson makes her an excellent choice to lead the department into its next stage of development."

One of Siegman's goals, she says, is to continue to foster collaborations with colleagues in other Jefferson departments. "It's been exciting to spend a career at Jefferson," she says. While she continues to pursue her research interests, she also gets "particular pleasure from teaching, which has been an unexpected reward from being here."

Siegman's research focuses on the biophysics of smooth muscle. She has authored or co-authored numerous peer-reviewed publications, including editing the monograph, "Regulation and Contraction of Smooth Muscle." Of her research career, she says: "It's been especially exciting because each step in the investigational process leads to another more interesting one." ❖

Freeman Receives Outstanding Woman Veterinarian of the Year Award

APS Member **Lisa C. Freeman**, a faculty member of the Kansas State University (KSU) College of Veterinary Medicine, received the Association for Women Veterinarians' Outstanding Woman Veterinarian of the Year Award at the annual meeting of the American Veterinary Medical Association July 13 in Nashville, TN.

Freeman, an associate professor of pharmacology, was recognized for special effort and achievement by a woman veterinarian in any area of veterinary medicine. She was nominated for the award by Frank Blecha, head of the department of anatomy and physiology and a university distinguished professor at KSU.

Freeman serves KSU, the veterinary profession and her community by being a teacher and mentor, researcher and scientist, administrator and leader, Blecha said.

"Aspiring veterinarians and researchers could not choose a better role model than Dr. Lisa Freeman," said Ralph Richardson, dean of the KSU College of Veterinary Medicine. "She is one of very few women veterinarians in the country with private practice experience, graduate and postdoctoral training and an active, peer-reviewed research program that embraces both basic and applied research."

Throughout her distinguished career, Freeman has instructed trainees ranging from undergraduates to postdoctoral fellows. She currently contributes to a course in pharmacology for second year students in the professional veterinary curriculum and has acted as an adviser to many veterinary students. She has also served as a research mentor and role model for countless postdoctoral students, clinical residents and young faculty members, many of whom have gone on to work in premier positions within the veterinary and medical professions.

In 2001, Freeman became director of mentored training, which includes administering the Veterinary Research Scholars Program at KSU. Her efforts were instrumental in attaining funding for the program through the National Institutes of Health and Merck-Merial Foundation, bringing KSU to the forefront of comparative biomedical research. The intense program is dedicated to training 10 veterinary students each summer in a research laboratory.

Since joining the KSU faculty in 1994, Freeman has established a nationally recognized, extramurally-funded research laboratory in the department of anatomy and physiology. Her primary interests include the structure and function of ion channels, particularly potassium channels, in the heart and ovary. Freeman is the author of more than 50 peer-reviewed publications, book chapters and abstracts. She has been an invited guest presenter at national and international research venues around the world.

Freeman earned a bachelor's degree in 1981 and a master's degree and doctor of veterinary medicine degree in 1986 from Cornell University. She went on to earn a PhD in pharmacology from The Ohio State University in 1989 while working as a part-time staff veterinarian at an animal clinic. ❖

Naji N. Abumrad is currently with the Department of Surgery, Vanderbilt Medical Center, Nashville, TN. Abumrad was formerly with the Department of Surgery, North Shore University Hospital, Manhasset, NY.

Jamie L. Barger has accepted a position with the Wisconsin Primate Research Center, University of Wisconsin, Madison, WI. Formerly, Barger was associated with the Institute of Arctic Biology, University of Alaska, Fairbanks, AK.

Irwin Gary Brodsky has taken a position with the Department of Medicine, Center for Endocrinology and Diabetes, Maine Medical Center, Scarborough, ME. Brodsky was formerly with the Department of Medicine, Section of Endocrine and Metabolism, University of Illinois, Chicago, IL.

Mark Burnley has accepted the position of Lecturer, at the University of Wales Aberystwyth, UK. Burnley had been associated with the Chelsea School, University of Brighton, Eastbourne, UK.

Catherine Anne Christian recently affiliated with the Neuroscience Graduate Program, University of Virginia, Warrenton, VA. Christian had previously been associated with the Neuroscience Program, Smith College, Northampton, MA.

Susan DeMesquita joined the Department of Physiology, Ross University School of Medicine, Roseau, West Indies. Mesquita had been with the Department of Physiology, Marshall University School of Medicine, Huntington, WV.

David M. Devilbiss recently joined the Department of Psychology, University of Wisconsin, Madison, WI. Devilbiss had previously been associated with the Department of Neurobiology and Anatomy, MCP-Hahnemann University, Philadelphia, PA.

Susan Laura Edwards has affiliated with the Department of Physiology and Pharmacology, James Cook University, Cairns, Australia. Prior to her new assignment, Edwards was associated with the Department of Biology, Georgia Southern University, Statesboro, GA.

Brian Joseph Harvey recently joined the Institute of Molecular Medicine, Royal College of Surgeons, Dublin, Republic of Ireland. Prior to his new position, Harvey was with the Department of Physiology, University College, Cork, Republic of Ireland.

Stephen R. Ikeda is now the Senior Investigator with the Laboratory of Molecular Physiology, National Institute of Alcohol Abuse and Alcoholism, NIH, Bethesda, MD. Prior to his new appointment, Ikeda was with the Laboratory of Molecular Physiology, Guthrie Research Institute, Sayre, PA.

Bradley B. Keller moved to the Department of Pediatrics, Division of Cardiology, Pittsburgh Children's Hospital, Pittsburgh, PA. Keller was formerly associated with the Department of Pediatrics, Division of Cardiology, University of Kentucky, Lexington, KY.

Sook Jeong Lee has affiliated with the National Heart Lung and Blood Institute, NIH, Bethesda, MD. Lee previously was associated with the Department of Physiology, University of South Florida, Tampa, FL.

Moshe Levi recently assumed the position of Co-Head, Division of Renal Diseases and Hypertension, Department of Medicine, University of Colorado Health Sciences Center, Denver, CO. Formerly, Levi was associated with the Department of Internal Medicine and Nephrology, VA North Texas Health Care System, Dallas, TX.

You Shuei Lin has accepted a position with the Department of Physiology, Taipei Medical University, Taipei, Taiwan. Previously, Lin was with the Department of Physiology, University of Kentucky, Lexington, KY.

Michael Pagliassotti joined the Department of Medicine, University of Colorado Health Science Center, Denver, CO. Pagliassotti had formerly been associated with the Department of Exercise Science, Arizona State University, Tempe, AZ.

Christopher M. Quick moved to the Department of Veterinary Physiology and Pharmacology, Texas A&M University, College Station, TX. Prior to his new position, Quick had been affiliated with the Department of Anesthesia, University of California, San Francisco, CA.

Katherine Janet Rennie accepted a position with the Department of Otolaryngology, University of Colorado Health Science Center, Denver, CO. Prior to her new assignment, Rennie was associated with the Department of Otolaryngology, University of Texas Medical Branch, Galveston, TX.

Steven Edward Riechman has affiliated with the School of Exercise, Leisure, and Sport, Kent State University, Kent, OH. Prior to his new position, Riechman was with the Department of Human Genetics, University of Pittsburgh, Pittsburgh, PA.

Scott E. Sinclair has associated with the Division of Pulmonary and Critical Care Medicine, University of Washington, Seattle, WA. Sinclair was formerly affiliated with the Department of Medicine, Division of Pulmonary and Critical Care Medicine, University of Tennessee, Memphis, TN.

Peter Thoren accepted a position with the Department of Integrative Pharmacology, AstraZeneca, Molndal, Sweden. Thoren had been associated with the Department of Physiology and Pharmacology, Karolinska Institute, Stockholm, Sweden.

Serge P. von Duvillard is currently Professor and Chairman, Department of Kinesiology & Health Promotion, California State Polytechnic University, Pomona, CA. Previously, von Duvillard had been affiliated with the

Human Performance Lab, Physical Education and Exercise Science, University of North Dakota, Grand Forks, ND.

Thad Elliott Wilson is currently a member of the Department of Biomedical Sciences, Southwest Missouri State University, Springfield, MO. Prior to his new assignment, Wilson was associated with the Institute for Exercise and Environmental Medicine, Presbyterian Hospital, University of Texas Southwestern Medical Center, Dallas, TX.

Di Wu is now affiliated with the Department of Physiology, University of California, San Francisco, CA. Wu previously was associated with the Department of Molecular and Cell Biology, University of California, Berkeley, CA.

Jin Xue has moved to the Department of Pediatrics, Albert Einstein College of Medicine of Yeshiva University, Bronx, NY. Prior to her new position Xue was affiliated with the Department of Pediatrics and Section Respiratory Medicine, Yale University School of Medicine, New Haven, CT.

Dion H. Zappe has accepted a position as Regional Scientific Director with Scientific Operations, Novartis Pharmaceuticals, Medway, MA. Zappe had previously been associated with Astra Zeneca Pharmaceuticals, Medway, MA.

E. Paul Zehr has accepted a position with the School of Physical Education, University of Victoria, Victoria, BC Canada. Zehr had previously been associated with the Neurophysiology Laboratory, University of Alberta, Edmonton, Canada.

Yingting Zhu joined the Arizona Cancer Center, University of Arizona, Tucson, AZ. Zhu previously was associated with the Department of Medicine, Buffalo VA Medical Center, Buffalo, NY. ❖

News From Senior Physiologists

Letter to Novera Herbert Spector

John Bligh writes: "What of interest can I say as I embark on my 81st journey round the sun? I think I'm well, I know I'm happy and the garden looks fine, but these are personal matters. I feel a need to say something more, and more seriously.

"The relative leisure of retirement provides an opportunity to reflect upon those early circumstances which helped to shape one. Amongst them is a more than 50-year-old influence upon all that followed. My laboratory life, delayed by those belligerent affairs of states in the 1940s, started at and with the beginning of the antibiotic and synthetic insecticide era. With penicillin to counter some of the more life-threatening pathogenic micro-organisms, and DDT to reduce the impact of diseases spread by insects, there was the promise of longer and healthier lives for all. It was soon realized, however, that while these new medical aids could prevent countless untimely deaths, the beneficiaries could not then be keep alive into old age unless food production could be increased in line with an escalating demand. Without that provision these medical remedies could only cause a shift in the causes of premature death from infections to hunger. That would be inevitable because humans, like virtually all other animal species, tend to breed in excess of replacement needs, and in excess of the number that can be fed adequately and can achieve maturity. A high incidence of premature deaths is the natural way by which a potential exponential rise in numbers is held in check. Considered globally, the sum of human populations is, and always has been, close to that number which the food supply can support, with the premature deaths of the unfeedable 'surplus' progeny. That may not be a pleasant or readily acceptable state of affairs, but it is intellectually inescapable. Thus, while the total sum of humanity is affected by changes in the sum of food production world-wide, medical endeavors can only materially influence populations in those regions where the food supply is plentiful. Thus, a concern I shared with others more than half a century ago, was that if the world's food supply could be progressively increased, the major medical and public health advances then occurring would turn tragically and painfully sour. On the assumption that I might do something useful, I was thus persuaded to pay more attention to agricultural animal physiology than to human physiology. By good fortune an agricultural revolution did occur, and it was this and not, in most parts of the world, the concurrently occurring medical advances, that enabled world population to increase from 2.5 billion to more than 6 billion in the last 50 years.

"Now, however, there are ominous signs that the upward progression of food production world-wide could be faltering, while the human population continues to increase. If the continuing efforts to make human lives not just safer but also longer lasting, and not to precipitate a human population crash, it is imperative that we ensure that medical advances that tend to prolong lives, are at all times matched by an equally intensive endeavor to increase food supplies. This is not to say that I consider agricultural research more vital to humanity than health-related research, but it is to say that agriculture is the necessary hand-maiden of medicine. Even with a general agreement that is so, it cannot be supposed that both human populations and their food supplies can continue to rise more-or-less exponentially for ever, or indeed, for very much longer. It is more than likely that food production will reach a zenith first, and, may then even start to decline. Hunger and premature deaths will then increase, and in that way the human population will be brought

down to that number which can be sustained by the diminished food supply. If we choose that road, which is the natural biological one, it must, at some time, bring misery and premature death to many more millions than already suffer that fate. So if I could start again and choose again, I would still be strongly influenced by an awareness of the need to equate populations and their food supplies in as a humane way as possible, but with the realization now that the only way to avoid the pain and suffering of natural population control, is to exercise control ourselves. This is the subject matter of what, if I can get it published, will probably be my last utterance as an erstwhile physiologist."

Letters to Karlman Wasserman

Merrill P. Spencer writes: "Thank you for your greetings and opportunity to tell my friends what I am doing now.

"I am the Executive Director of the Institute of Applied Physiology and Medicine as well as Executive Director of the International Cardiac Doppler Society that was organized by myself several years ago. I am also the Medical Director of two sister companies, Spencer Vascular and Spencer Technologies.

"We have developed a new modality for transcranial Doppler diagnosis and monitoring called power m-mode Doppler (PMD). The equipment displays two channels of directionally colored power of the Doppler signal along the ultrasound beam, directed through the skull, along with one sample of blood velocities in a selected vessel. The PMD has improved the finding of transcranial ultrasound windows and provides a devinitive signature of microemboli.

"I spend most of my time doing clinical research in one of my vascular laboratories and supervising my technical staff. Recently we have used our PMD to diagnose patent foramen ovale and monitor its transcatheter closure with a new closure device.

"I am in excellent health and my wife, Joanne, and I travel a lot, mostly to neurology meetings. I do not intend to retire as long as I feel well."

Max E. Valentinuzzi writes: "To cross the 70th mark in acceptable running conditions is quite an accomplishment, even in these days of significant longer life expectancy. To receive a kind letter from a fellow physiologist, Karlman, carrying greetings and warm regards along with a nice invitation to submit a note to *The Physiologist*, asking questions like what are you doing now?, are you continuing with scientific activities and scientific or other writings?, what are your current interests?, do you have any words of wisdom to pass on to your younger colleagues?, is a stimulating little (or big) fact that tells me what a beautiful and rewarding activity I chose in my life and what wonderful people I got to know.

"The three first questions can be readily satisfied: Retired but still active, under a contract with the Universidad Nacional de Tucuman (UNT), as part-time Professor, and under another contract with the Consejo Nacional de Investigaciones Cientificas y Tecnicas (CONICET), as Fellow Investigator. My research activities include a project on cardiovascular mechanics and another one on the psychophysiologic effects of music. I also supervise two doctoral graduate students. Besides, I am writing a textbook on Bioengineering (with a lot of Physiology in it) under a contract with World Scientific Publishers, based at New Jersey and Singapore, while I play piano and record my own cassettes to relax my mind during the intermissions and, on weekends, I travel with my wife to a house (yet unfinished) hidden in Los Zazos-Amaicha, a small 5,000 people peaceful village at about 6,000 feet above sea level, after passing El Infiernillo at more than 9,000 feet, in the Calchaqui Valleys of the Province of Tucuman. The socio-economic debacle of our unbelievably shaken country is then forgotten, gazing at the majestic mountains, always bewitched by the clear nights and their overpowering Via Lactea (the Milky Way), watching placid grazing goats, pigs and burros, talking about simple things with simple, honest wise people.

"Some recollections and musings may answer at least partially the last question. It was my father, Max Valentinuzzi, Sr., physician and physicist, who perhaps back in 1941, when I was nine or so, used to take me to his Biophysics Lab at the National Academy of Medicine, in Buenos Aires, and showed me for the first time the beating heart of a frog (I did not suspect how many I was going to use in laboratory exercises), what the galvanic skin response was, teaching me also how to use a Leeds & Northrup Poggendorff potentiometer. One of those days, around 1943, there was a scientific meeting at the Academy's auditorium. I had to go to the restroom and, while in there, I heard two old gentlemen speaking in English. As I learned thereafter, one of them was Dr. Bernardo Houssay, who won the Nobel Prize of Physiology in 1947. Years later, around 1955, and when I was in the Engineering School at the University of Buenos Aires, my father invited Dr. Bliss, a well-reputed biostatistician from Yale University, I believe, to offer a series of talks. It was in one of those that I met Dr. Houssay for the second time, already crowned by the Nobel halo. By then, I had become a student member of the IEEE and, soon, also a member of the Professional Group on Medical Electronics.

"Much water ran under bridge during the 47 years that elapsed ever since. On the personal side, the roads of life made me meet in Houston, TX, Hebbel E. Hoff and Leslie A. Geddes back in 1962, scientists, in-born teachers and friends, who literally changed my whole life, putting in my hands new intellectual elements, giving me a taste for the history of science and the beauties of classical experimental physiology. Soon thereafter, Roger Guillemin became one of my highly respected and dear teachers, one who still honors me with his noble friendship. I still keep a short letter from him thanking me for a note where, more than one year before (1975 or so), I forcasted the Nobel Prize for him. In 1982, Rene Favaloro and his

(continued on page 476)

(continued from page 475)
group, due to a number of happy coincidences, came to a close contact with our little and modest laboratory, giving rise to several years of productive collaboration. His traumatic disappearance brought me deep sorrow and pain (1). These are the names that left a deep imprint in me and, very likely, some of it was also transmitted to my students over the years, as some kind of intellectual DNA that shapes up the intellectual progeny, something that so many times Hebbel Hoff and Roger Guillemin used to underline. Other scientific personages very briefly touched my life, as sparks: Kenneth Cole (back in 1976, in Ottawa, Canada), Luis F. Leloir (in 1978-79, in Argentina, also a Nobel winner), Kiichi Sagawa (in Buenos Aires, 1982, and in Baltimore, 1988), Otto Schmidt (at the University of Minnesota, in 1991, with whom I spent almost a whole day), Herman Schwan (in Philadelphia, in 1991). Somehow, those short and improvised conversations were also able to leave long-standing messages and memories. Learning is fortunately a never-ending process.

"Personal life is interwoven with social, political, economic and scientific events. There is no way to separate them out. My generation was initiated with the vacuum tube, saw the transistor birth, the development of the operational amplifier, the integrated circuits, the microprocessor and the personal computer. Point to point communications were superseded by the satellites, the web, and the cellular phones, while the SPUTNIK in October 1957 and later on the female dog astronaut Laika left us speechless. Amazement after amazement came as an overwhelming waterfall: cardiac pacemakers, implantable defibrillators, open heart surgery, cardiac transplantation, myoelectric prostheses, implants of different types ...so many and so revolutionary that our life styles, ways of thinking and philosophical attitudes have been profoundly changed. In science and technology and in biomedical knowledge, mankind has advanced more in the XXth Century than in all the previous centuries.

"Interdisciplinary studies have become the most productive concept. Historically, and for a long period of time (Middle Age, Modern Times), knowledge was thought as a unified set with science being considered a relatively smaller portion called Natural Philosophy (as opposed to the higher Theologic and Human Philosophy). Our current PhD's or Doctor of Philosophy degrees stem in these old ideas. Disciplines and more focalized specialties showed up much later. Sciences seem to come together once more, but the attitude now is more positive and constructive, so much that isolation within a single scientific and technical compartment denying the influences and contributions from the outside may mean self-extinction. The Theory of Creativity, introduced by Arthur Koestler (2) very clearly holds that mental collisions, facilitated by inter- and multi-disciplinary activities, favor the understanding of problems, discovery, inventivity and the generation of fresh knowledge.

"In 1944, Erwin Schroedinger, Nobel laureate and cofounder of Quantic Mechanics, published a small and famous book, *What is Life?* It became later on a hallmark for the development of the current *Molecular Biology* (3). It was an attractor for other physicists who were brought to the area of Biology starting up a revolutionary movement with transcendent contributions from Computer Science, Physics, Electronics, Mathematics, and Telecommunications. The Human Genome Project (4) dramatically exemplifies the projections and still unforeseen reach of this fascinating and apparent melange. The emerging virtual surgery (5) seems to cross the borders of science fiction while cellular engineering, artificial organs and biomaterials are opening new roads to explore with huge practical possibilities. No doubt, the barely started XXIst New Century is the dawn of a brilliant New Physiology (6,7).

"However, and despite the tremendous scientific and technological progress, the true and cruel huge problem of mankind is still open: inequality, as manifested by deep and growing socio-economic differences that lead to insufficient education, malnutrition and endemic diseases, to an insensitive affluent minority and an enormous suffering majority (8). The recent Twin Towers tragedy in New York City followed by the retaliation against Afghanistan, both paying an unmeasurable toll in human lives and destruction, sowing nothing but hatred for the future, flag bluntly a human problem of still unsuspected magnitude and consequences. No one is left out.

The XXth Century started with about 1,000 million inhabitants; the New XXIst Century is beginning with about 6,000 million people, and we know that before 2050 the number will climb up to may be 12,000 millions. Besides, in less than 30 years there will be severe limitations in the availability of fresh potable water. Science in general, technology, physiology and bioengineering in particular: what could they do or offer to solve or alleviate the pressures emerging from such demands? Certainly, more and better weapons and more powerful armies are not the proper and sensible way. Perhaps, we had better remember that before anything else, we are simply men and women, that being is much better than having and that independently of how much richness, or power, or knowledge, or worldly glories we might collect and store, the really important and significant fact is and will be how much we love and how much we have loved. And the scientific endeavor calls for a lot of love."

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John Severinghaus writes: "My family threw a party this May for my 80th birthday, with about 130 guests at the Marin Art and Garden Center —extravagant but fun.

"High altitude research is over for me. I had to abandon a trekking group at 4,300 meters near the Kangshung face of Everest in Tibet a few years ago—severe ventilatory drive, not pulmonary or cerebral edema.

"Our most recent work showed that angiogenesis-induced capillary breakdown probably underlies high altitude cerebral edema (HACE). Feng Ping Xu and I found vascular endothelial growth factor (VEGF), the angiogenesis signature, in hypoxic rat brain, and Marlowe Eldridge and I found VEGF in human nasal washes during rapid ascent to altitude. Nosebleed is common at altitude.The International Society for Oxygen Transport to Tissue is now about 30 years old and thriving.

"When pulse oximeters became available in 1985, I began a program of testing their accuracy at low saturation, as part of my interest in high altitude and its problems. I had generated an accurate simple equation of the oxygen dissociation curve, and applied it to a method to predict arterial oxygen saturation from end tidal mass spectrometer analysis of P_{CO_2} and P_{O_2}. This permitted me and my group to safely briefly expose healthy volunteers to saturations as low as 40% for 15-30 seconds and then sample arterial blood oxygen saturation. This turned into a service for manufacturers needing data to submit to FDA, and continues at an accelerating rate. We have been testing one to three new instruments on six to 12 volunteers each month in the anesthesia Hypoxia Research Lab at UCSF. I manipulate inspired oxygen, watching the computed estimated saturation on an old analog meter, which is more useful than a rapidly changing digital numerical display.

"Several years ago, Tom Hornbein, chief of Anesthesia at the University of Washington, Seattle, alerted me to a serious problem with care of a dear friend of his at our Marin General Hospital. After I reported the second hand information at a District Board Meeting, I was unanimously elected by the board to serve out a term when one member resigned for ill health, and then in November 2000 I was re-elected by 62% of Marin County voters responding to numerous charges against the corporate board that leased the hospital in 1985, illegally, it became apparent. We now await court action of the District's lawsuit to invalidate that lease and recover public control of medical and nursing policies. I learned this morning that I will face nine other candidates for the three seats this November.

"I lecture on altitude pathophysiology, regulation of respiration and acid base balance to each year's group of CVRI fellows and anesthesia residents. Our lab has been moved at least five times since I retired, and will move again in a few weeks to a hopefully more permanent location in Moffitt Hospital, taking over a three bed unoccupied patient room. That human study lab is shared with many other Anesthesia Department investigators.

"While I have abandoned the large national anesthesia and physiology meetings, I delight in subspecialty groups like ISOTT and the Anesthesia History Association which celebrated Ralph Waters' appointment 75 years ago this May to the world's first academic anesthesia department in Madison, my home town, where my father's office was next door to Waters' office. Most current academicians trace their roots to him. Last year Elinor and I attended the Scandanavian Anaesthesia Society far north of the arctic circle in Tromsø, Norway—a large metropolitan agricultural and industrial city in addition to its fishing traditions. We've been regulars at those meetings for 40 years, rotating between the five Scandanavian countries. My lecture in Tromsø reported the discovery, 220 years late, of the lost letter from Swedish pharmacist Carl Wilhelm Scheele to Antoine Lavoisier of his discovery of oxygen two years before Priestley. Popular lecture to that Nordic audience!

"Forty-four years ago this week Elinor and I bought this house in Ross where I now spend more time gardening than either politicking or researching. Dahlias and roses are at their peak now—no aphids in August! Our four children remain single keeping us from aging into grandparenthood. Ed builds medical and electronic devices, Jean head-hunts for the packaging industry, Wendy writes and edits, and Jeffrey, the youngest is just now extracting trapped methane from Greenland glacier ice dated to 11,500 years ago to understand how the ice ages came to such a sudden end.

"In December 2000, I broke my back when my ladder slid off our Sequoia (Christmas light fixing), but I'm very lucky—fully healed, no residual pain or limits. Elinor continues to join me in most meeting travel, and has graciously continued to feed me even for lunch most of the time."

Letter to David Bohr

Horace Davenport writes: "I am grateful for having the opportunity to be a physiologist. I have enjoyed learning and teaching physiology, and my research has given me more reward than frustration. I am also grateful for the knowledge that my teaching and research have done some good in the world and that my historical writing has amused and enlightened some of my colleagues. All this is a bit sententious. Physiology has been fun." ❖

Awards Available From International Society for the Study of the Lumbar Spine

The International Society for the Study of the Lumbar Spine (ISSLS) would like to announce the call for nominations for the following awards: ISSLS Stryker Lifetime Achievement Award; International ISSLS Fellowship; MACNAB/LAROCCA Research Fellowship Award; and the Surgical Dynamics Travelling Fellowship Award.

Further information about the awards, including stipend amounts, eligibility requirements, and deadlines is available at http://www.issls.org. ❖

Special Issue of the *ILAR Journal* Available

The key to useful, ethical experiments using laboratory animals is good design.

The best research starts with clear research questions, a robust experimental design, good use of statistics, careful control of biological variation and choice of appropriate animal strains, among other considerations. Well-designed animal experiments use the minimum number of animals necessary to achieve the scientific objectives, but not so few as to miss biologically important effects or require repetition of experiments.

The National Academies' Institute for Laboratory Animal Research (ILAR) is pleased to present a very special issue of the *ILAR Journal*. Geared for research scientists and IACUC members, the issue provides practical advice on how to perform animal experiments more efficiently and humanely, improve overall quality and quantity of research, and get papers more readily published in high-quality journals. Find out how to:

choose the right animal model for study;

calculate sample size to maximize treatment effects;

identify sources of variation, both genetic and environmental;

minimize experimental variation through advanced statistical analysis.

ILAR Journal is the quarterly peer-reviewed publication of the National Academies' Institute for Laboratory Animal research (ILAR). *ILAR Journal* provides thoughtful and timely information for all those who use, care for and oversee laboratory animals. To order this issue or get a subscription, call 202-334-2591 or order online at http://www.nationalacademies.org/ilar. ❖

Christine Mirzayan Science and Technology Policy Internship Program of the National Academies

This Internship Program of the National Academies—consisting of the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—is designed to engage graduate and postdoctoral students in science and technology policy and to familiarize them with the interactions among science, technology, and government. As a result, students in the fields of science, engineering, medicine, veterinary medicine, business, and law develop essential skills different from those attained in academia, which will help them make the transition from being a graduate student to a professional.

We are pleased to announce that applications are now being accepted for our 2003 program. This year, the internship program will comprise three sessions:

Winter: January 13 through April 4 (12 weeks with a possible 4 week extension).

Summer: June 2 through August 8 (10 weeks).

Fall: September 8 through November 26 (12 weeks).

To apply, candidates should submit an application and request their mentor fill out a reference form. Both are available on the Web at http://national-academies.org/internship. The deadline for applications is **November 1** for the Winter program, **March 1** for the Summer program, and **June 1** for the Fall program. Candidates may apply to all three programs simultaneously.

Additional details about the program and how to join our mailing list are also available on the Web site. Questions should be directed to: internship@nas.edu. ❖

The Physiologist
Vol. 45, No. 5, 2002

Critical Issues in Tumor Microcirculation, Angiogenesis and Metastasis: Biological Significance and Clinical Relevance

A Continuing Education Course of Harvard Medical School and Massachusetts General Hospital
Boston, MA, USA
June 2-5, 2003

Rakesh K. Jain of Harvard Medical School and Massachusetts General Hospital is offering a Continuing Medical Education summer course entitled "Critical Issues in Tumor Microcirculation, Angiogenesis and Metastasis: Biological Significance and Clinical Relevance." The purpose of the course is to present the latest findings in cancer research.

This course meets the criteria for 22 credit hours in category I of the Physician's Recognition Award of the American Medical Association.

For more information, please access our web site http://steele.mgh.harvard.edu. ❖

Call for Nominations
FASEB Excellence in Science Lecture and Award 2004

Purpose: To recognize outstanding achievement by women in biological science.

Eligibility: *1*. All women who are members of one or more of the societies of FASEB will be eligible for nomination.

2. Nominations recognize a woman whose research has contributed significantly to further our understanding of a particular discipline by excellence in research.

Nominations:

1. Nominations may be made only by members of the FASEB Societies.
2. A call for nomination of candidates for the Excellence in Science Award will be posted in the newsletters of the individual Societies as well as the *FASEB Newsletter* and *The FASEB Journal*.
3. The call for nominations will be made each year in November. The nomination deadline is **March 1, 2003**. The nomination will be transmitted to the FASEB Board before its Spring meeting.
4. Nominations must be made in the form of a letter, original and fourteen (14) copies, setting forth in detail:
   the contribution(s) to the field that represents the nominee's outstanding achievement in science
   leadership and mentorship
   evidence of national recognition
   honors and awards
5. Fifteen (15) copies of the curriculum vitae and brief selected bibliography of the nominee, as well as fifteen (15) copies of no more than five (5) reprints, must accompany the nomination.
6. Additional letters of support (fifteen (15) copies each) for the nominee are encouraged, especially from former students.
7. The nominations and supporting letters are to be sent to:
Ms. Tia B. Poole, FASEB Excellence in Science Award, Federation of American Societies for Experimental Biology, 9650 Rockville Pike, Bethesda, Maryland 20814-3998. Tel: 301-634-7090; E-mail: tpoole@execofc.faseb.org

Selection

1. The Excellence in Science Award Committee, comprised of a member from each Society of the Federation, will receive the nominations and recommend an awardee based on an evaluation of scientific accomplishments.
2. The awardee must agree to present an Excellence in Science Lecture.
3. The name of the awardee and a summary of the candidate's qualifications will be sent to the FASEB Board for approval at the Spring meeting.

Award Presentation:

The award will be presented before presentation of the Excellence in Science Lecture by the awardee. The award will be presented by the Chair of the Excellence in Science Award Committee or her representative in conjunction with a member of the FASEB Board. The award includes a $10,000 unrestricted research grant, funded by Eli Lilly and Company, travel expenses, complimentary registration at the meeting, and a plaque in recognition of the award. ❖

13th Annual Neurology for the Primary Practitioner

December 7, 2002
Harbor Court Hotel, Baltimore, MD
Sponsored by: Department of Neurology; The Johns Hopkins University School of Medicine

This is a one-day course intended to update primary care practitioners regarding common neurologic problems with emphasis on practical aspects of diagnosis and management. The intended audience includes internists, family practitioners, nurse practitioners, physician assistants, neurologists, gerontologists, rehabilitation physicians and other interested individuals

Credit: AMA Category 1 and other appropriate credits pending

Fee: Physicians -$150
Residents*/Allied Health Professionals -$100
*with verification of status

For further information: Office of Continuing Medical Education, Johns Hopkins University School of Medicine, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205-2195 ; Tel.: 410- 955-2959; Fax: 410-955-0807; Email: cmenet@jhmi.edu; website: http://www.med.jhu.edu/cme.

Please contact the Office of Continuing Medical Education at the above address if you have any questions. ❖

4th International Symposium on Agmatine and Imidazoline Systems

April 9-11, 2003
Bahia Resort Hotel
San Diego, CA

This two-day symposium will focus on the concept of an agmatinergic system, inclusive of the receptors labeled by imidazoline ligands as well as other endogenous compounds related to agmatine. Current research on the metabolism and function of agmatine, as well as recent pharmacological and molecular studies of imidazoline binding proteins, will be discussed with a bent towards the possible therapeutic potential of this system.

The symposium will occur just prior to Experimental Biology 2003, and has official satellite status through ASPET. Registration and abstract deadline is **December 31, 2002.** For more information please visit our website (http://aisymposium.aacdp.org/) or contact: John E. Piletz, Depts. of Psychiatry, Pharmacology & Physiology, University of Mississippi Medical Center, 2500 North State St., Jackson, MS 39216-4505 USA
Email: AISymposium@psychiatry.umsmed.edu ❖

Robert Wood Johnson Health & Society Scholars Program

The Robert Wood Johnson Health and Society Scholars Program is designed to build the nation's capacity for research, leadership and action to address more effectively the broad range of factors affecting health. The program is founded on the principle that progress in the field of population health depends upon collaboration and exchange among the social, behavioral and health sciences.

The goal of this interdisciplinary national program is to improve health by training scholars to:

Rigorously investigate the connections among biological, behavioral, environmental, economic and social determinants of health; and

Develop, evaluate and disseminate knowledge and interventions based upon integration of these determinants.

The program is designed to produce leaders who will change the questions asked, the methods employed to analyze problems and the range of solutions offered to improve the health of all Americans.

Each year the program will enable up to 18 outstanding individuals who have completed doctoral training to engage in an intensive two-year program at one of six nationally prominent universities. The first cohort of scholars will enter training in August 2003.

Scholars will have access to a full range of university resources and will receive annual stipend support of $68,000 for year one and $71,000 for year two. They will receive financial support for research-related expenses, training workshops and travel to professional meetings.

For more information about the program and to request application forms, please contact: The Robert Wood Johnson Health & Society Scholars Program, The Robert Wood Johnson Foundation, Route 1 & College Road East, PO Box 2316, Princeton, NJ 08543-2316. Tel.: 800-734-7635; Email: hss@rwjf.org. For additional information, please visit http://www.healthandsocietyscholars.org.

Deadline for receipt of applications is **October 25, 2002**. ❖

The Physiologist
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13th Annual Computed Body Tomography for the Technologist 2002

October 24-27, 2002
Flamingo Las Vegas
Las Vegas, NV
Sponsored by: Johns Hopkins University School of Medicine, The Russell H. Morgan Department of Radiology and Radiological Science

This meeting presents a comprehensive review and update of the current role of Computed Body Tomography for the CT Technologist with an emphasis on Spiral (Helical) CT and the multidetector CT technology. The lectures are designed to present the material from both an anatomic and pathologic approach with emphasis on CT technique and optimization of scanning protocols. Recent advances in CT application, including multidetector CT, CT angiography, and three-dimensional imaging will be addressed. The role of CT compared to other imaging modalities, both from a cost-effective standpoint and from better clinical management, will be discussed and addressed during the various lectures. After attending the meeting, the technologist will have a better understanding of the current state-of-the-art of CT and will be aware of the changes that are taking place in clinical CT scanning today. This hopefully will inspire and excite the technologist to optimize their daily practice.

The Johns Hopkins University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The Johns Hopkins University School of Medicine takes responsibility for the content, quality and scientific integrity of this CME activity.

The Johns Hopkins University School of Medicine designates this educational activity for a maximum of 23 hours in category 1 credit toward the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the activity.

The American Registry of Radiologic Technologists recognizes Category 1 for Category A credit for the radiologic technologist.

For more information, please contact: Office of Continuing Medical Education, Johns Hopkins University School of Medicine, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205-2195. Tel: 410-955-2959; Fax: 410-955-0807; or Email: cmenet@jhmi.edu

19th Annual Computed Body Tomography 2003: The Cutting Edge

February 13-16, 2003
Disney Yacht and Beach Club Resort
Lake Buena Vista, Orlando, FL
Sponsored by: Johns Hopkins School of Medicine, The Russell H. Morgan Department of Radiology and Radiological Science

This seminar, for the radiologist, will provide a comprehensive review of recent advances in computed body tomography with some correlation with Magnetic Resonance Imaging (MRI). A series of focused lectures has been designed to concentrate on specific topics in depth. Participants will have the opportunity to expand their knowledge of the latest concepts in multidetector-row CT, CT angiography, the value of high resolution CT in the chest, the uses of CT in the GI tract, clinical application of musculoskeletal CT, cardiac CT and PET/CT in oncology. There will be time for questions and discussion.

Participants will expand their knowledge in: the latest concepts in chest and cardiac CT, the newest applications of multidetector/multislice CT, the clinical applications of CT angiography (CTA), the role of CT in GI pathology, including virtual colonoscopy, the latest concepts in liver and renal imaging.

The Johns Hopkins University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The Johns Hopkins University School of Medicine takes responsibility for the content, quality and scientific integrity of this CME activity.

The Johns Hopkins University designates this educational activity for a maximum of 22 hours in Category 1 credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

For more information, please contact: Office of Continuing Medical Education, Johns Hopkins University School of Medicine, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205-2195; Tel: 410-955-2959; Fax: 410-955-0807; or Email: cmenet@jhmi.edu ❖

Moving?

If you have moved or changed your phone, fax, or email address, please notify the APS Membership Office at 301-530-7171 or fax to 301-571-8313. Your membership information can also be changed by visiting the Members Only portion of the APS website at http://www.the-aps.org.

November 1-2
Ontogeny of Motor Behavior: From Neurogenesis to Behavior, Orlando, FL. *Information:* Email: Mary.Kyriakides@med.monash.edu.au; Internet: http://www.ritchiecentre.monash.org/neuro.

November 18-21
Genomics on Target: From Function to Validation, Sheraton Boston Hotel, Boston, MA. *Information:* Genomics on Target, 1037 Chestnut Street, Newton Upper Falls, MA 02464; Tel: 617-630-1300; Fax: 617-630-1325; Internet: http://www.genomicsontarget.com.

2003

February 1-5
The 2003 Miami Nature Biotechnology Winter Symposium: 50 Years On: From the Double Helix to Molecular Medicine, Miami Beach, FL. *Information:* MNBWS, 1011 N.W. 15 St., Rm. 315, Gautier Bldg., Miami, FL 33136-1019. Fax: 305-324-5665; Internet: http://www.med.miami.edu/mnbws.

February 2-7
Sixth International Congress of Comparative Physiology and Biochemistry, Mount Buller Village, Australia. *Information:* Abstract deadline and Early Bird Registration deadline are **September 30, 2002.** Email: iccpb@Latrobe.edu.au; Internet: http://www.zoo.Latrobe.edu.au/iccpb.

February 2-7
Gordon Research Conference on Salivary Glands and Exocrine Secretion, Ventura, CA. *Information:* David Castle, Department of Cell Biology, University of Virginia Health System, School of Medicine, P.O. Box 800732, Charlottesville, VA 22908-0732. Tel: 434-924-1786; Fax: 434-982-3912; Email: jdc4r@virginia.edu; Internet: http://www.grc.uri.edu.

February 15-20
SPIE International Symposium Medical Imaging, Town and Country Hotel, San Diego, CA. *Information*: Internet: http://www.spie.org/info/mi.

February 19-22
13th International Hypoxia Symposium, Banff Mountain Centre, Banff, Alberta, Canada. *Information*: http://www.hypoxia.net.

March 1-5
Biophysical Society 47th Annual Meeting, San Antonio, TX. *Information:* Biophysical Society, 9650 Rockville Pike, Bethesda, MD 20814; Tel: 301-530-7114; Fax: 301-530-7133; Email: society@biophysics.org; Internet: http://www.biophysics.org.

April 9-11
4th International Symposium on Agmatine and Imidazoline Systems, San Diego, CA. *Information:* John E. Piletz, Depts. of Psychiatry, Pharmacology & Physiology, University of Mississippi Medical Center, 2500 North State St., Jackson, MS 39216-4505 USA. Email: AISymposium@psychiatry.umsmed.edu; Internet: http://aisymposium.aacdp.org/.

May 13-17
The 30th Annual Meeting of the International Society for the Study of the Lumbar Spine, Vancouver, Canada. *Information:* Secretary, Dr. Scott Bodes, Sunnybrook and Women's Health Science Center, Room MG 323, 2075 Bayview Ave., Toronto, Canada M4N 3M5. Tel: 416-480-4833; Fax: 416-480-6055.

June 2-5
Eighteenth Annual Offering of Critical Issues in Tumor Microcirculation, Angiogenesis and Metastasis: Biological Significance and Clinical Relevance, Boston, MA *Information:* Internet: http://steele.mgh.harvard.edu.

June 28-July 3
3rd Congress of the Federation of European Physiological Societies, Nice, France. *Information:* Sophia Antipolis, Faculte des Sciences, 06108 Nice Cedex2, France. Tel: +33 4 92076851; Fax: + 33 4 92076850; Email: FEPS2003@unice.fr; Internet: http://www.unice.fr/FEPS2003/.

June 29-July 4
International Society for Developmental and Comparative Immunology (ISDCI) - 9th International Congress, St. Andrews, Scotland. *Information:* Dr. Val Smith or Mrs. Jane Williamson, Gatty Marine Laboratory, School of Biology, University of St. Andrews, Fife KY 16 8LB. Email: v.j.smith@st-and.ac.uk or jmcw@st-and.ac.uk; Internet: http://www.st-and.ac.uk/~seeb/ISDCI/home.htm.

July 20-24
XIX International Congress of Biochemistry & Molecular Biology, Toronto, Canada. *Information:* Congress Secretariat, National Research Council Canada, Ottawa, ON, Canada K1A 0R6. Tel: 613-993-9431, Fax: 613-993-7250; Email: iubmb2003@nrc.ca; Internet: http://www.nrc.ca/confserv/iubmb2003.

September 27-October 1
European Respiratory Society Annual Congress 2003,Vienna, Austria. *Information:* ERS Headquarters, 1, boulevard de Grancy, CH-1006 Lausanne, Switzerland. Fax: +41 21 617 28 65; Internet: http://www.ersnet.org.