

# Physiologists at US Medical Schools: Education, Current Status, and Trends in Diversity

Marsha Lakes Matyas and Martin Frank

In 1989, APS requested information from the Association of American Medical Colleges (AAMC) Faculty Roster System (FRS) concerning the status of two groups of faculty members in US medical schools: 1) faculty who hold PhD degrees in physiology and 2) faculty members with appointments in departments of physiology. The data provided by the AAMC were used by the Long Range Planning Committee in the development of its report on the health of physiology (1). In 1994, APS requested an update of information on physiologists on the faculty of medical schools from the AAMC. The data provided by the 1994 AAMC Faculty Roster survey provide insights into changes that have occurred among the physiology faculty at these institutions. Information on graduate degrees in physiology also was requested from the National Research Council Survey of Earned Doctorates, which students complete when they receive their doctoral degree (2).

### **Education and Training of PhD Physiologists**

In general, the number of PhDs in animal and human physiology awarded to US citizens and permanent residents has been slowly declining since 1980 (Table 1). The annual number peaked at 323 in 1980, dropped to 208 by 1985, and has ranged between 189 and 231 annual degrees since that time. The decline in the number of physiology PhDs awarded was not paralleled by an overall drop in the number of biological sciences PhDs. As shown in Table 1, in the 1970s

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physiology PhDs accounted for 8% of all PhDs awarded in biological sciences; this proportion dropped to 5-6% in the 1980s.

It should be noted that these data reflect student selfidentification of their field of study. The decline in the number of students earning degrees in physiology may reflect an actual drop in the number of degrees awarded and/or a trend among students to identify themselves as working in other physiology-related fields rather than in "physiology" itself.

The enrollment of physiology graduate students at US medical colleges did not show a similar decline over the same period (Table 2). Between 1978 and 1992, the number of students enrolled in graduate programs in physiology at US medical colleges ranged from 212 to 532 for master's students and from 1,201 to 1,462 for doctoral students. There was, however, a substantial increase in the number of postdoctoral students at these institutions, especially after 1984.

The proportion of physiology PhDs earned by women increased substantially over this period. In 1976, women earned only 18% of the physiology PhDs awarded, but by 1988, the proportion of physiology degrees earned by women had increased to 42% (Table 1). Since 1988, the proportion has ranged from 33 to 41%. The data are not as encouraging for minority students, however. From 1976 to 1987, minorities (African-Americans, Hispanics, and Native Americans) earned only 2-3% of physiology PhDs annually. Since 1988, that proportion has increased to 4-6%, but overall the increase in the numbers of degrees awarded to minority students is negligible. For example, in 1992, four degrees each were awarded to African-Americans and Hispanics, and no degrees were awarded to Native Americans. The total number of physiology PhDs awarded to minority students between 1976 and 1992 was 131, an average of 7.7 per year.

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## **Funding Opportunity**

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The Geriatrics Program, National Institute on Aging, supports research on clinical problems that occur predominantly among older persons or that are associated with increased disability, morbidity, and mortality in older people. The cardiovascular, pulmonary, and renal area is one of nine extramural programmatic areas administered through the Geriatrics Program.

This program will develop and support a broad-based, clinically relevant, research portfolio on normal agerelated changes (structure/function) of the cardiovascular, pulmonary, hematologic, and renal systems and their importance in age-related pathologies, pathophysiologies, dysfunctions, and diseases in mature and older individuals. Research will include human and animal studies on normal aging, pathophysiological processes and mechanisms, and responses to experimental therapies; diagnostic, intervention, and epidemiologic studies including risk factor analyses; and clinical trials of prevention and treatment.

Information: Andre J. Premen, Director, Cardiovascular Aging Program, Geriatrics Program, National Institute on Aging, 7201 Wisconsin Ave., Suite 3E327, Bethesda, MD 20892-9205. Tel: 301-496-6761; fax: 301-402-1784.

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## A Matter of Opinion

# The Experimental Biology Meeting: It's Our Meeting

This article outlines a set of initiatives that are part of the American Physiological Society's contribution to the continuing development of the Experimental Biology meeting. These initiatives do not set a new structure for the meeting, rather they represent the beginning of a process, a process that I believe will ultimately change the face of the EB meetings.

The goals motivating the following proposals were to ensure that we present quality science at the Experimental Biology meeting and, in addition, to sustain EB as a meeting distinguished by a catholic approach spanning many disciplines and encompassing the full range of biological integration. A niche for such a meeting exists, and there is no reason why EB should not fill that niche, except if we fail to make it sufficiently rewarding and exciting. In my view, if the meeting were simply dissolved, another meeting with similar emphasis would have to be created, and since the structure already exists we should use it.

The problems with Experimental Biology, as currently constituted, are two. First, a sense of ennui all too often pervades the air. I was told on more than one occasion during the past year that only the science that investigators deemed not fit to present at a Gordon Conference or other "hot topic" event was presented at EB. Obviously, such a feeling will color the atmosphere and give all of us the sense that we are simply going through the motions.

Second, EB was created in a time of turmoil as the Federation was reorganized, and the formation of EB took place in an environment of great uncertainty. Operationally, the change was made from the "Federation meeting" to the "Experimental Biology meeting"; FASEB takes off its shirt and "bam" it becomes EB! That metamorphosis is incomplete, however, as EB remains "sort of" the old Federation meeting and "sort of" something else. I imagine that the complete transformation of Experimental Biology will involve a realignment of scientists from many societies, some currently participating societies in EB, some not, but all taking place within the context of a different Experimental Biology meeting, one which, because of its association with established societies (with resources at their command), will be able to adapt to the rapidly changing needs of science.

Three actions have been taken by APS as initial steps in the process of transformation. First, at a joint retreat of Council, the Program Committee, the Program Advisory Committee, and the Section Advisory Committee, a plan was developed that will allow a group of participants in future APS spring meetings (concurrent with the EB meetings) to explore one topic in depth over a period of two days of scientific presentations. The **Physiology InFocus Program**, described on the next page, will be guided by the President-Elect and organized by an investigator chosen by the President-Elect in consultation with the Executive Committee and the Program Committee. Once an individual is selected to run the Physiology InFocus Program, he or she will have enormous flexibility in topic, in program modality, and in the societal origins of the individuals who will present. More importantly, the total elapsed time, from concept to presentation of what we anticipate will be an exciting new program, will be one year, and we expect that the result will be an intense exploration of a topic of immediate importance to modern biology.

A second initiative taken by those who attended the retreat, although at the moment modest in scope, has the potential for enormous impact on the immediacy of APS programming. As many as three symposia will be held open for submission and approval as late as November preceding a meeting in April. Such symposia can be built around fastbreaking scientific discoveries and programmed and presented while momentum and excitement are high.

A third initiative, taken as part of a long-term, coordinated plan, could potentially yield a new operating structure for Experimental Biology. The basic concept is that the theme structure of Experimental Biology will be more intensely focused on the directions in which scientific research is progressing. We have begun discussions with the Experimental Biology Board, and with a number of Federation societies, aimed at determining how such themes could be identified and nurtured. In contrast to the current situation, themes would have no "life of their own." They would exist only in the context of rapid advances in science and would evolve and disappear as science changed.

An exciting aspect of the proposal is that modern data processing and communication methods make it possible to advertise both the themes of the Experimental Biology meeting and the meetings of participating societies, such as the American Physiological Society, as separate and simultaneous events. In other words, themes could be advertised as independent scientific expositions existing within the framework of Experimental Biology. With such a structure, investigators who are members of the participating societies would be able to submit abstracts and symposia either through their normal societal program structure or through a program structure built around highly focused, scientifically sound and exciting themes.

Why build such a complicated structure? Simply because it responds to the needs of our members and the needs of many of the members of the principal programming societies of EB. Such a structure can simultaneously provide for the meetings of the constituent societies and respond to the stimuli of scientific discovery. Both are accomplished within the context of a large meeting, which parenthetically it should be noted has a strong element of support running through all of the societies of EB, as well as Cell Biology and Neuroscience. This support is based on the fact that a large meeting provides a breadth of scientific experience and exposure to scientific instrumentation, through the exhibits, that simply cannot be attained in a smaller meeting.

Let me close by some reflections on two quotes: "Them is us!" and "If we build it, they will come." "Them is us!" reflects the fact that, as I have worked through this year, it has become ever more clear to me that there is no external force preventing us from doing whatever we want with our scientific meeting-not the Federation, not EB-nothing except us.

"If we build it, they will come" is a paraphrase of course from "Field of Dreams." It simply reflects the fact that good meetings get better because people think exciting science is being presented at those meetings and the people want to go where the exciting science is taking place. If we build a strong, exciting meeting, they will come.

We are entering a period in which integrative biology is once again a subject of interest as scientists are being forced to consider complex, interacting systems at higher levels of organization. Our society often claims to be a home for such thought. The question now is, "Can we manifest the vision that will allow us to guide the evolution of our meeting so it will be a venue for the presentation of new views of the integration of form and function?

> B.R. Duling President

# **Physiology InFocus Program**

#### **Summary**

The Physiology InFocus Program is an innovative addition to the EB meeting structure, conceived in response to members who wish to place intense and varied discussion of a special research theme at the forefront of the APS portion of the EB meetings. The Physiology InFocus Program will bring the top scientists from different disciplines in a specific research area to EB to discuss, debate, and analyze their research in a concentrated two-day format, thereby promoting interaction and learning that could not be accomplished otherwise. In effect, the Physiology InFocus Program will be similar to an APS Conference, but it will be held within the structure of the EB meeting. We hope that other societies participating in the EB meetings will develop their own InFocus Programs, with exciting formats appropriate to their needs.

#### Background

The concept of the Physiology InFocus Program was developed at the 1994 APS Council Retreat. Members of the Program and Program Advisory Committees met to discuss aspects of the APS meetings that could be improved to meet the needs of members of the various sections. There was consensus that a solution to many of the perceived deficits of the EB meetings could be ameliorated by addition of program content that would address timely issues in an interdisciplinary format. In this case, an interdisciplinary format is defined as including at least several interest groups within APS and participating societies, encompassing varied levels of biological organization (molecular to systemic), and using tools of more than one broadly defined scientific discipline (i.e., physiological, pharmacological, and biochemical). The concept was discussed extensively during the Retreat and approved by the Council.

#### Structure

The APS President-Elect, after consultation with the Executive Cabinet and representatives of Program and Program Advisory Committees (representing section interests), selects a Physiology In-Focus Program topic and InFocus Program Director. The Physiology InFocus Program topic should be selected to engender excitement due to its scientific and health-related impact. The Physiology In-Focus Program Director should be among the foremost scientists in the topic area. The InFocus Program Director, in consultation with the APS President-Elect, will then select a diverse organizing committee that includes people with expertise in several disciplines.

The InFocus Program organizing committee, in turn, creates the Physiology InFocus Program, paying particular attention to ensuring that the program crosses levels of biological organization (i.e., from molecules to systems) and research approach (i.e., from biochemical to pharmacological). The committee will

- identify keynote speakers;
- organize one to three symposia, each to include three to five experts, and time for audience discussion;
- consider inclusion of novel program modes: debates, pointcounter point, tutorials, and workshops;
- organize at least one minisymposium from submitted abstracts (including a keynote or summary talk); and
- arrange a luncheon with students and key participants.

The Physiology InFocus Program will have full support of the APS. The InFocus Program Chair will be given a budget that can be used at his or her discretion (honoraria, student prizes, etc.). Symposium and keynote speakers will be reimbursed for travel and three days at \$100 per diem. FASEB society members and nonmembers will have registration waived.

#### Timetable

Fall 1994	Identify InFocus Program Director and topic
March 1, 1995	Complete InFocus Program submitted to APS
April 1, 1995	Review by Program Committee
Sept. 1, 1995	Call for papers includes identification of InFocus
	Program topic
Jan 1, 1996	Abstracts for minisymposia and poster sessions selected
April 1, 1996	APS InFocus Program(s) included in EB '96

#### PHYSIOLOGISTS AT US MEDICAL SCHOOLS

(continued from p. 1)

	% of All Biological Sciences PhDs				orities
Year	No. of PhDs	Awarded	%Women	No.	%
1976	266	8	18	8	3
1977	287	9	17	5	2
1978	284	8	18	8	3
1979	296	8	24	8	3
1980	323	8	20	5	2
1981	311	8	25	7	2
1982	276	7	25	8	3
1983	223	6	26	5	2
1984	214	5	24	7	3
1985	208	5	29	7	3
1986	211	6	35	5	2
1987	208	6	33	7	3
1988	189	5	42	8	4
1989	231	6	39	10	4
1990	214	6	36	13	6
1991	220	6	41	12	5
1992	199	NA	33	8	4

Table 1.	PhD Degrees	in Physiology	Awarded to US	5 Citizens and	<b>Permanent Residents</b>
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Minorities include African-Americans, Hispanics, and Native Americans. NA, datum not available. Source: Survey of Earned Doctorates, Office of Science and Engineering Personnel, NRC, Washington, DC, April 1994.

### Faculty at US Medical Schools

The following section presents information on the status of physiologists and faculty in departments of physiology at US medical schools. The data for this section are drawn from the AAMC FRS. The AAMC FRS is the only comprehensive information system of its kind, containing continuously updated data on the careers of current and past medical school faculty members; the database contains information on more than 80% of US medical schools. Representatives appointed by the deans of every US medical school and the faculty themselves provide the FRS data. Started in 1966 and sponsored in part by NIH since its inception, the FRS is used for annual reports on medical school faculty, for policy studies, to provide standard and custom reports to member institutions, as a means of identifying and locating current faculty members (particularly alumni), and as a recruitment service intended to assist medical schools and selected other institutions seeking to appoint senior faculty (3).

Between 1989 and 1994, the AAMC implemented new data-collection strategies to increase the proportion of schools

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providing complete survey information. During this same period, there was considerable growth in the overall size of the medical school faculties. Therefore, changes in absolute numbers of faculty members within a particular category may reflect real growth, improved data collection, or both. In general, therefore, comparisons of absolute numbers is not advisable and, for the purposes of this report, only proportions of faculty in different categories are discussed.

### **Faculty Holding Degrees in Physiology**

*Numbers, rank, and status.* In 1994, 42% of physiologists at US medical schools held the rank of Professor compared to 38.4% in 1989 (Table 3). In both 1989 and 1994, Associate Professors accounted for 28.5% of physiologists on faculty and Assistant Professors accounted for an additional 27%. Instructors accounted for only 3.6% of the physiologists in 1989 and 2.7% in 1994. More than half of the faculty holding degrees in physiology had tenure in 1994, and an additional 17% were in tenure track positions (Table 4).

Gender diversity among physiologists at medical schools changed little during this period. The proportion of female

	No. of Students	Graduate Enrolled		No. of Faculty					
Year	MS	PhD	No. of Postdoctorates	Full time	Part time	Volunteer	Vacant positions		
1978	409	1,345	494	1,720	87	274	83		
1979	532	1,386	538	1,702	92	256	99		
1980	368	1,462	542	1,686	86	288	77		
1981	402	1,355	507	1,768	92	338	75		
1982	293	1,385	426	1,849	80	408	83		
1983	295	1,201	468	1,776	96	357	108		
1984	414	1,358	539	1,855	78	366	104		
1985	341	1,351	637	1,814	77	361	104		
1986	434	1,220	600	1,892	65	403	93		
1987	296	1,352	733	2,006	79	467	84		
1988	324	1,290	750	1,848	70	454	67		
1989	212	1,305	841	1,870	71	454	73		
1990	282	1,395	777	1,884	115	450	67		
1991	327	1,368	805	1,923	100	446	64		
1992	349	1,401	786	1,863	103	462	54		

#### Table 2. Graduate Students and Faculty at US Medical Schools

Source: AAMC, 1989 and 1994.

# Table 3. Faculty Holding Physiology Degrees:Distribution by Rank

	19	89	1994		
Rank	No.	%	No.	%	
Professor	926	38.4	948	42.0	
Associate professor	688	28.5	644	28.5	
Assistant professor	648	26.9	604	26.8	
Instructor	88	3.6	60	2.7	
Other	34	1.4			
Missing	28	1.2			
Total	2,412	100.0	2,256	100.0	

physiologists increased only marginally, from 13.7% (N = 330) to 15.9% (N = 361). Among physiologists at US medical schools, women's representation increased slightly at every rank between 1989 and 1994: from 7.3% (N = 68) to 9.3% (N = 88) among Professors, from 15.3% (N = 105) to 16.3% (N = 105) among Associate Professors, from 19.3% (N = 125) to 23.8% (N = 144) among Assistant Professors, and from 26.1% (N = 23) to 30.0% (N = 18) among Instructors. How-

ever, women are much less likely than their male cohorts to be in tenure track positions. In 1994, at every faculty rank, proportionately fewer women were tenured and more women were not on tenure track. This was especially true at the Assistant Professor level where more than half of women faculty holding degrees in physiology were not in tenure track positions (Table 4).

Racial/ethnic diversity among medical school physiologists also showed little improvement. The overall proportion of minority physiologists (African-American, Native American, and Hispanic) increased only slightly, from 2.3 to 3.4%. In terms of actual numbers, the 1994 AAMC survey identified only 2 Native Americans, 33 African-Americans, and 43 Hispanics among medical school physiologists. Minority physiologists, including Asians, were overrepresented at the Instructor level compared to their overall representation among medical school faculty (Table 5). For example, in 1994, Asians comprised more than 25% of all medical school Instructors with physiology degrees but only 8.2% of the total faculty holding physiology degrees. African-Americans accounted for only 1.5% of all faculty with PhD degrees in physiology yet comprised 3.3% of the Instructors.

Departmental appointments and areas of specialty. In both 1989 and 1994, more than half of medical school physiologists held appointments in basic science departments (Ta-

	Professor				A	Associate Professor			Assistant Professor				Instructor			
	Male		Female		Male		Female		Male		Female		Male		Female	
Tenure Status	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Tenured	725	84.3	73	83.0	303	56.2	53	50.5	13	2.8	1	0.7	0	0.0	0	0.0
On tenure track	21	2.4	3	3.4	94	17.4	17	16.2	201	43.7	46	31.9	4	9.5	3	16.7
Not on tenure track	75	8.7	8	9.0	115	21.3	27	25.7	190	41.3	81	56.3	31	73.8	12	66.7
Tenure N/A	5	0.6	0	0.0	3	0.6	0	0.0	5	1.1	2	1.4	0	0.0	0	0.0
No tenure at institution	20	2.3	3	3.4	18	3.3	б	5.7	19	4.1	5	3.5	0	0.0	1	5.6
Missing	14	1.6	1	1.1	6	1.1	2	1.9	32	6.9	9	6.3	7	16.7	2	11.1
Total	860	100.0	88	100.0	539	100.0	105	100.0	460	100.0	144	100.0	42	100.0	18	100.0

Table 4. Faculty Holding Physiology Degrees: Distribution of by Sex, Rank, and Tenure Status, 1994

Detail on percentages may not total 100% due to rounding. N/A, not applicable.

Table 5. Faculty Holding Physiology Degrees: Distribution by Kank and Eth	logy Degrees: Distribution by Rank a	l Ethnicit
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		1989							1994							
	Professor		Associate Professor		Assistant Professor		Instructor		Professor		Associate Professor		Assistant Professor		Instructor	
Racial/Ethnic Group	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Native American	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.3	0	0.0
Asian	55	5.9	43	6.3	49	7.6	7	8.0	68	7.2	37	5.7	63	10.4	16	26.7
African- American	9	1.0	9	1.3	8	1.2	1	1.1	8	0.8	11	1.7	12	2.0	2	3.3
Mexican- American	3	0.3	3	0.4	0	0.0	0	0.0	5	0.5	3	0.5	2	0.3	0	0.0
Puerto Rican	1	0.1	1	0.1	2	0.3	0	0.0	3	0.3	2	0.3	3	0.5	0	0.0
Other Hispanic	9	1.0	2	0.3	3	0.5	1	1.1	9	0.9	5	0.8	10	1.7	1	1.7
White	821	88.7	596	86.6	540	83.3	77	87.5	828	87.3	552	85.7	482	79.8	39	65.0
Refused	26	2.8	32	4.6	36	5.6	2	2.3	24	2.5	32	5.0	26	4.3	2	3.3
Missing	2	0.2	2	0.3	10	1.5	0	0.0	3	0.3	2	0.3	4	0.7	0	0.0
Total	926	100.0	688	100.0	648	100.0	88	100.0	948	100.0	644	100.0	604	100.0	60	100.0

ble 6), especially departments of physiology. Among the clinical departments, internal medicine had the largest proportion of physiologists (14%). The FRS also asks individual faculty members to indicate their particular field of study; respondents have the option to write in fields that are not included in the question's checklist. In terms of specific

physiology disciplines, in 1994 more than 70% of respondents stated that their area was "general physiology." Neurophysiology (8%), cardiovascular physiology (5%), and reproductive physiology (4%) accounted for an additional 17% of medical school physiologists.

	19	89	1994							
Department	No. %		No.	%						
	Basic .	science								
Anatomy	109	4.5	95	4.2						
Biochemistry	62	2.6	40	1.8						
Microbiology	18	0.7	9	0.4						
Basic pathology	45	1.9	34	1.5						
Pharmacology	124	5.1	122	5.4						
Physiology	923	38.3	849	37.4						
Other basic science	55	2.3	63	2.8						
Subtotal	1,336	55.4	1,212	53.3						
Clinical										
Anesthesiology	89	3.7	101	4.4						
Internal medicine	331	13.7	321	14.1						
Neurology	72	3.0	70	3.1						
Obstetrics & gynecology	100	4.1	100	4.4						
Clinical pathology	14	0.6	16	0.7						
Pediatrics	83	3.4	81	3.6						
Surgery	118	4.9	132	5.8						
Other clinical	224	9.2	197	8.7						
Subtotal	1,031	42.7	1,016	44.8						
Administration	19	0.8	15	0.6						
All others	26	1.1	28	1.4						
Total	2,412	100.0	2,273	100.0						

Table 6. Faculty Holding Physiology Degrees:Distribution by Department

Detail on percentages does not total to 100% due to rounding.

### Faculty in departments of physiology

Numbers, rank, and status. In both 1989 and 1994, the AAMC FRS included information on more than 1,800 faculty members with appointments in physiology departments in US medical schools. Similar to faculty with degrees in physiology, more than 40% of the faculty members in departments of physiology held the rank of Professor and less than 3% were in Instructor positions. The majority of faculty members in departments of physiology in 1994 held PhD (86%) or MD-PhD degrees (5%); only about 6% held an MD degree only (Table 7). This distribution is similar to that in 1989. Over 60% of the faculty in physiology departments had tenure in

	19	89	19	94
Degree	No.	%	No.	%
MD only	140	7.8	113	6.2
PhD/OHD	1,526	84.5	1,551	85.6
MD-PhD/MD-OHD	99	5.5	89	4.9
Other	41	2.3	58	3.2
Total	1,806	100.0	1,811	100.0

OHD, other health doctorate. Detail on percentages may not total 100% due to rounding.

1994, and an additional 16% were in tenure track positions (Table 8).

As stated earlier, respondents are asked to indicate their specific field of study or discipline on the FRS survey (Table 9). In 1989, 55.6% of faculty in departments of physiology self-identified themselves as "physiologists" while in 1994, only 53% did so. Other fields commonly cited in 1994 were biochemistry (11.8%), pharmacology (5.8%), biology (4.6%), biophysics (4.1%), and psychology (2.7%).

The proportion of women holding faculty positions in physiology departments increased only slightly, from 14.1 to 16.6%. Women's representation increased between 1989 and 1994 at every rank (Table 10). However, women in physiology departments—similar to women physiologists in all departments—are much less likely than their male cohorts to be in tenure track positions (Table 8). In 1994, at every faculty rank, proportionately fewer women were tenured and more women were not on tenure track. This was especially true at the Assistant Professor level where 45% of women faculty in departments of physiology were not in tenure track positions.

Racial/ethnic diversity among faculty in physiology departments remains limited. The overall proportion of underrepresented minority faculty in physiology departments (African-American, Native American, and Hispanic) increased from 3.7 to 5.3%. Again, these percentages represent very small numbers of persons. For example, in 1994 there was a total of 2 Native American/Alaskan Natives, 34 African-Americans, and 60 Hispanics on faculty in departments of physiology.

Asians, Hispanics, and African-Americans are overrepresented in Instructor positions compared to their total representation on the faculty in departments of physiology (Table 11). For example, whereas Asians comprise 6.9% of the total faculty in departments of physiology, they account for 18.9% of the Instructors in those departments. Similarly, African-Americans are 1.2% of faculty but 5.7% of Instructors and Hispanics are 2.4% of faculty but 9.4% of Instructors. These

		Profe	essor	or Ass			te Professor			Assistant Professor				Instructor			
_	M	lale	Fe	male	M	lale	Fei	male	M	lale	Fe	male	N	lale	Fe	male	
Tenure Status	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Tenured	669	88.2	68	87.2	269	67.9	56	62.9	8	2.6	2	1.9	0	0.0	0	0.0	
On tenured track	19	2.5	1	1.3	57	14.4	15	16.8	149	49.5	42	40.8	2	5.9	1	6.7	
Not on tenure track	36	4.7	6	7.7	51	12.9	12	13.5	113	37.5	46	44.7	28	82.4	11	73.3	
No tenure at institution	24	3.2	2	2.6	14	3.5	3	3.4	10	3.3	6	5.8	0	0.0	1	6.7	
Missing	10	1.3	1	1.3	5	1.3	3	3.4	21	7.0	7	6.8	4	11.8	2	13.3	
Total	758	100.0	78	100.0	396	100.0	89	100.0	301	100.0	103	100.0	34	100.0	15	100.0	

 Table 8. Faculty in Departments of Physiology at US Medical Schools: Distribution by Sex, Rank, and Tenure Status, 1994

Detail on percentages may not total 100% due to rounding.

Table 9. Faculty in Departments of Physiologyin US Medical Schools: Distribution by Discipline

	19	89	1994			
Discipline	No.	%	No.	%		
Anatomy	33	2.0	26	1.6		
Biochemistry	139	8.6	188	11.8		
Biology	75	4.6	74	4.6		
Biophysics	76	4.7	65	4.1		
Genetics	5	0.3	10	0.6		
Immunology	5	0.3	5	0.3		
Microbiology	8	0.5	15	0.9		
Neurobiology	15	0.9	35	2.2		
Nutrition	6	0.4	4	0.2		
Pathology	6	0.4	6	0.4		
Pharmacology	79	4.9	93	5.8		
Physiology	902	55.6	848	53.1		
Zoology	37	2.3	31	1.9		
Endocrinology	27	1.7	32	2.0		
Chemistry	32	2.0	33	2.1		
Engineering	43	2.6	35	2.2		
Physics	29	1.8	26	1.6		
Psychology	48	3.0	43	2.7		
Other	23	1.4	27	1.7		
None	35	2.2	0	0.0		
Total	1,623	100.2	1,596	99.8		

Detail on percentages may not total 100% due to rounding.

groups are also concentrated more in Assistant Professor positions than at higher faculty level positions.

### Discussion

Education and training. The decline in the number of physiology PhDs earned annually may reflect a number of phenomena. First, there may be an actual decline in student interest in physiology studies. In addition, physiology departments in medical schools and/or other colleges and universities may be limiting the number of students they are willing to enroll in response to reduced research funding. Conversely, the consistent number of graduate students enrolled in medical school physiology departments (Table 2) suggests that the decline in earned degrees may be due to a decrease in degree completion rates among physiology graduate students rather than a decrease in enrollment or interest. Finally, when students complete the Survey of Earned Doctorates form, they may simply be listing their field of study as a related field, choosing to affiliate themselves with fields that they perceive as "hot" research fields at the current time rather than choosing physiology. Each of these possible causes merits further examination, especially at the departmental level.

Departmental appointments and areas of specialty. Most PhD physiologists working in US medical schools are affiliated with a department of physiology. However, the faculty within the departments of physiology may be becoming more diverse in terms of their areas of specialty. In both 1989 and 1994, approximately half of the faculty in departments of physiology self-identified themselves as physiologists. However, there was a slight shift toward fewer physiologists in medical school physiology departments (from 56 to 53%). This change may be caused by a tendency for departments to hire new faculty from areas associated with active research funding. This is also suggested by the increases in faculty

		19	89					
	M	ale	Fei	male	M	ale	Fei	male
Rank	No.	%	No.	%	No.	%	No.	%
Professor	675	43.6	50	19.6	758	50.4	78	25.9
Associate Professor	450	29.1	76	29.8	396	26.3	89	29.6
Assistant Professor	335	21.7	96	37.7	301	20.0	103	34.2
Instructor	47	3.0	17	6.7	34	2.3	15	5.0
Other	29	1.9	14	5.5	15	1.0	16	5.3
Missing	11	0.7	2	0.8	0	0.0	0	0.0
Total	1,547	100.0	255	100.0	1,504	100.0	301	100.0

### Table 10. Faculty in Departments of Physiology in US Medical Schools: Distribution by Sex and Rank

Detail on percentages may not total 100% due to rounding.

Table 11.	<b>Faculty in Departments</b>	of Physiology in	<b>US Medical Schools:</b>	<b>Distribution</b> by	<b>Rank and Ethnicity</b>
	i ucuity in Deput unions		CO MICHICHI DEMOUNT	- is a not a choir wy	ACMINE MILO ANTIMICON

		1989									1994						
Racial/Ethnic Group	Prof	Professor		Associate Professor		istant fessor	Inst	ructor	Prof	fessor	Ass Prot	ociate fessor	Assistant Professor		Instructor		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Native American	0	0.0	0	0.0	1	0.2	0	0.0	1	0.1	1	0.2	0	0.0	0	0.0	
Asian	39	5.4	37	7.0	39	9.0	5	7.8	45	5.4	33	6.8	35	8.7	10	18.9	
African- American	8	1.1	7	1.3	5	1.2	1	1.6	8	1.0	10	2.1	11	2.7	3	5.7	
Mexican- American	2	0.3	2	0.4	1	0.2	0	0.0	2	0.2	2	0.4	1	0.2	0	0.0	
Puerto Rican	1	0.1	1	0.2	1	0.2	0	0.0	2	0.2	2	0.4	5	1.2	0	0.0	
Other Hispanic	14	1.9	10	2.0	7	1.6	3	4.7	16	1.9	7	1.4	18	4.5	5	9.4	
White	631	87.0	442	83.7	349	80.6	54	84.4	733	87.7	409	84.2	308	79.2	27	50.9	
Refused	25	3.5	23	4.4	12	2.8	1	1.6	24	2.9	14	2.9	14	3.5	3	5.7	
Missing	5	0.7	6	1.1	18	4.2	0	0.0	5	0.6	8	1.6	12	3.0	5	9.4	
Total	725	100.0	528	100.0	433	100.0	64	100.0	836	100.0	486	100.0	404	100.0	53	100.0	

Detail on percentages may not total 100% due to rounding.

specializing in biochemistry (from 8.6 to 11.8%), neurobiology (from 0.9 to 2.2%), and pharmacology (from 4.9 to 5.8%) between 1989 and 1994. However, the self-report format of the FRS raises the same questions for these data as for the student data above, that is, "Are physiologists more likely now to claim affiliation with highly funded research areas? If so, what are the implications for the physiology community, as a whole and for the professional societies that serve it?" Women in physiology. The number and proportion of physiology PhD degrees earned by women have increased substantially over the past 15 years. These increases have not been paralleled by similar increases in women's representation in departments of physiology at US medical schools. There has been only a slight improvement in the proportion of women with physiology degrees at US medical schools and in departments of physiology. One positive trend is that proportionately more women on faculty are in full Professor positions in 1994 than in 1989 and proportionately fewer are in Instructor positions.

However, overall, women physiologists are not in as good a position in schools of medicine to become permanent members of the faculty compared to their male peers. There have been only small increases in the proportion of women at the entry level position of Assistant Professor, and 45-56% of these are not tenure track positions. Also, women continue to be far more likely than men to be in an Instructor position, which offers little or no opportunity to establish an independent research record. Women are less likely to be tenured at every level (Professor, Assistant Professor, and Associate Professor) and are more likely to be in nontenure track positions at every level except Instructor. Unless women are in tenure track positions that provide a solid opportunity for promotion, we cannot expect to see significant positive changes in gender distribution of tenured physiology faculty at US medical schools in the future.

Minority faculty in physiology. There has been very little progress in significantly increasing the number and proportion of PhD degrees in physiology earned by minority students. Long-term federally funded programs such as Minority Access to Research Careers and Minorities in Biomedical Research Studies are currently reexamining their programs to determine how to be more effective at addressing this problem. Ultimately, however, improvements in the recruitment and retention of minority students in physiology studies and careers must happen at the level of the department and the individual research group. Longitudinal studies are needed to help determine what specific strategies departments and individual faculty members can employ to increase minority representation among physiology PhD recipients.

Similar to women, minorities are not well positioned to become permanent physiology faculty members in US medical schools. In departments of physiology at medical schools, there has been little change in the proportion of faculty positions held by Native Americans and Asians. There have been very small increases between 1989 and 1994 for Hispanics (as a group) and African-Americans. Among faculty with PhDs in physiology, the increases were primarily among Asians. Other minority groups remained stable. Overall, there are a very small number of minorities working in physiology at US medical schools. Underrepresented minorities (Native Americans, African-Americans, and Hispanics) comprise only 56 of 2,412 faculty members with degrees in physiology (2.3%). In departments of physiology, underrepresented minorities account for only 67 of the 1,806 faculty members (3.7%). Native Americans are virtually unrepresented among physiology faculty.

Minorities are found in disproportionately high numbers in Instructor positions, especially Asians. Among faculty with degrees in physiology, Asians hold more than 25% of the Instructor positions but account for only 6.6% of the overall faculty with degrees in physiology. To increase the racial/ethnic diversity of physiologists at US medical schools, the approach must be twofold: 1) actively recruit and retain undergraduate and graduate students into physiology research and 2) ensure that minorities have opportunity to hold tenure track positions with the departments.

## **APS** initiatives

APS has a long history of support programs designed to encourage the participation of students in the physiological sciences, particularly minority and female students. The Society works to increase student interest in physiology careers through the activities of the APS Career Opportunities in Physiology Committee, including distribution of a physiology careers poster to each biology/life sciences department in US 2- and 4-year colleges and universities; the development and distribution of the APS publication *Listing of Institutions Granting Degrees in Physiology*; and career workshops for high school, graduate, and postdoctoral students at Experimental Biology. Currently, the committee is working on the development of a speakers' bureau to spark student interest in physiology at an early age.

The Society also works to introduce students to the physiology community and to fellow physiologists. Students receive free membership in the Society for one year and pay significantly reduced rates for each year thereafter. In addition, the Society provides travel awards to more than 80 graduate and postdoctoral students annually to attend Experimental Biology and the APS conferences.

In 1966, APS initiated the Porter Physiology Development Program, which has supported the pre- and postdoctoral training of over 60 minority scientists via teaching and training fellowships. The Society's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Minority Travel Fellowships Program introduces minority students to physiology through attendance in and participation at our scientific meetings. Since its inception in 1987, the APS-NIDDK Minority Travel Fellowships Program has provided 210 travel fellowships to 161 students and faculty members at 17 scientific meetings. NIDDK Minority Travel Fellowships account for more than half of the total student/postdoctoral travel fellowships awarded by the Society. The APS also has worked to improved the retention of women in physiology through the APS Women in Physiology Mentoring Program initiated in 1993. The goal of the program is twofold: 1) to help increase the mentoring and networking interactions among women physiologists and 2) to encourage professional interaction between male and female scientists, both junior and senior.

It is apparent from the data provided in this report that we must expand and improve our efforts to encourage student interest in physiological sciences, support their completion of physiology degrees, and increase the diversity of both students and faculty in the physiological sciences. The Society hopes to work with the membership to identify programs to crease the diversity of both students and faculty in the physiological sciences. The Society hopes to work with the membership to identify programs to encourage the participation of all students in the physiological sciences and to provide technical assistance in the development of programs at the national, regional, and local levels.

 Giebisch, G., J. Granger, J. Greenleaf, R. Lydic, R. Mitchell, E. Nadel, S. Schultz, J. Wood, and E. Knobil. What's past is prologue. *Physiologist* 33: 161-188, 1990.

# **APS Gopher Server—Serving the Community**

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The APS Gopher Information Server has been providing the APS membership and the scientific community with information about the Society since the server's inception in December 1992. At the time, the APS Gopher was one of the first initiated by a nonprofit association and was number eight on the listing of US Gopher Servers. Since that time, many more associations, institutions, and for-profit organizations have started Gopher servers with the result that APS is now number 56 on the listing of "all" Gopher servers in the US.

While it might be a little more difficult to find the APS Server now that it has slipped down the list, its use has not diminished as a result. In an article (*Physiologist* 36: 232-233, 1993) about the utilization of the APS Gopher, it was noted that the APS Server was accessed by 340 host computers with 2,227 connections in December 1992. The utilization had increased to 874 host computers with 5,297 connections by September 1993. As evidenced in Table 1, those numbers pale in comparison with utilization by 2,700 host computers with 15,316 connections as of October 1994.

A review of the number of connections made to the main menu (Table 2) explains what the community is looking for when it accesses the APS Gopher Server. The most frequently accessed areas are found in Publications, Employment, and

	No. of Hosts	No. of Connections
December '92	340	2,227
March '93	541	4,008
June '93	707	4,243
September '93	874	5,297
December '93	1,048	6,061
March '94	1,706	10,990
June '94	1,833	12,535
September '94	2,296	14,226
November '94	2,700	15,316

The Survey of Earned Doctorates is managed through the Of-

fice of Science and Engineering Personnel at NRC/NAS, Wash-

Data are from the 1989 and 1994 AAMC FRS. For additional

information, see US Medical School Faculty, 1994, Faculty

Roster System, Association of American Medical Colleges,

What's New! These are the three areas that have generated the most interest throughout most of the history of the Server.

"What's New!" is designed to point the user to new features on the APS Gopher Server. New reports or an-

Table 2. APS Gopher Information Server: Main Menu Utilization

	Dec. '92	Mar. '93	June '93	Sept. '93	Dec. '93	Mar. '94	June '94	Sept. '94	Nov. '94
Main menu	618	963	1,089	1,250	1,442	2,386	1,839	2,191	2,385
Administration	111	49	36	65	54	74	104	145	173
Announcements	101	82	70	78	85	140	216	209	205
Author	25	61	59	60	79	119	122	133	155
Committee reports	20	48	60	89	79	108	88	120	134
Employment	0	186	244	284	357	676	808	967	1,085
Introduction	223	205	188	222	248	364	306	343	391
Public affairs	0	76	66	76	84	103	91	109	102
Publications	211	353	345	429	519	915	934	1,033	1,140
What's New!	0	207	250	274	359	497	490	457	544

# Table 1. APS Gopher Information Server:Access and Utilization

nouncements are regularly highlighted in this area. In addition, the community is informed when new jobs are posted or new publications-related material is added to the Server.

The "Employment" section provides a listing of all jobs published in *The Physiologist*. For a fee of \$50, employers are able to post job vacancies on Gopher for a three-month period and have the announcement published in *The Physiologist*. Assuming we can generate interest from the student and postdoctoral members of the Society, an effort will be made to add a "Positions Wanted" section to the "Employment" listing.

The "Publications" selection provides the user with access to a wealth of information about the APS publications. Within this section, users find information on how to order the journals, who serves as an editor or associate editor of each APS journal, and the scope statement and the table of contents of each journal. Posted on Gopher up to three weeks in advance of publication, users can search through the Table of Contents of the journals by using Wide Area Information Server, a search tool that finds each occurrence of key words and provides a list of titles containing the requested words. An additional feature to be found under the "Publications" heading is *APStracts*.

APStracts (ISSN 1073-0664) is an on-line publication of current research scheduled to be published in the journals of The APS. The abstracts published in APStracts are for articles that have been accepted for publication in APS journals. Articles are not scheduled for a specific issue when they are accepted, and abstracts may appear in APStracts as much as four months prior to the print publication of the article. Dates of manuscript submission and acceptance for publication are included with the abstract. Information in *APStracts* is archived on the APS Gopher Information Server for future reference.

Initiated in January 1994 with the American Journal of Physiology: Cell Physiology abstracts, APStracts has received increasing attention as the Society has reduced its delay in getting the material up onto the APS Server. As indicated in Table 3, utilization of APStracts has grown steadily since its initiation with 529 connections made in October 1994. Over 100 connections were made to the APStracts for the American Journal of Physiology: Cell during the same month. Based on the success of our pilot effort, the Society has expanded APStracts to include the abstracts of all the journals published by The APS. In so doing, the Society is providing the scientific community with advance notification of what will be published in future issues of the Society's journals. Hopefully, APStracts will help enhance the Society's reputation for the timely publication of research in the physiological sciences.

A review of the connections made to the "Publications" section can also be used to examine which APS journal is most popular among individuals using the Gopher Server. As evidenced by Table 4, the most popular APS journal is the *Journal of Neurophysiology*. Other journals with high user interest include the *American Journal of Physiology: Cell Physiology* and the *American Journal of Physiology: Heart and Circulatory Physiology*.

The APS Gopher Server can also be used to access the FASEB Membership Directory. By going into the Admini-

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
Publications	863	737	915	897	902	934	749	855	1,033	1,240	1,140
Publications/ APStracts	345	226	301	284	408	316	315	417	416	529	508
Publications/ APStracts/94	265	144	194	177	201	187	147	196	211	244	225
Publications/ APStracts/94/ acp	201	95	118	104	101	97	85	112	94	104	96
Publications/ APStracts/94/ toc	124	74	90	64	92	84	61	91	102	113	111
Publications/ APStracts/ whatis	114	66	83	74	115	82	77	129	104	135	116
Publications/ APStracts/94/ title	93	42	59	51	49	51	35	44	50	65	52

 Table 3. APS Gopher Information Server: APStracts Utilization in 1994

### APS NEWS

			· · · · · · · · · · · · · · · · · · ·					
Journal	Dec. '93	Mar. '94	June '94	Sept. '94	Nov. '94			
AJP:Cell	89	114	149	159	156			
AJP:Heart	69	97	117	128	117			
AJP:Lung	23	46	30	36	33			
AJP:Renal	25	32	50	43	55			
AJP:Endo	30	49	140	96	94			
AJP:GI	26	41	82	57	68			
AJP:Regu	32	47	62	58	37			
AJP:Advances	20	25	38	35	48			
JAP	57	65	95	123	139			
JN	80	126	171	201	258			
PRV	51	89	70	105	118			

Table 4. APS Gopher Information Server: Connections to APS Journal Information, Including Table of Contents

AJP, American Journal of Physiology; JAP, Journal of Applied Physiology; JN, Journal of Neurophysiology; PRV, Physiological Reviews.

stration Section of the APS Gopher Server, users can access the Directory and obtain current information about members of APS and the other FASEB Societies.

The APS Gopher Information Server has been established to meet the needs of our membership and the scientific community. If there is a feature on the Server that needs to be modified or if you have suggestions for additional items that should be included, please contact marty@aps.mhs.compuserve.com. Every effort will be made to address your concern. The APS Gopher Information Server is just the start of the Society's efforts in electronic publication. Starting in 1995, *APStracts* and other APS information will be available on World Wide Web. In 1996, the Society plans to begin publishing the APS journals either on CD-ROM or on World Wide Web. The Society will keep you informed of developments in future issues of *The Physiologist*.

Future Meetings	5
<b>1995</b> Experimental Biology '95	April 9-13, Atlanta, GA
APS Conference Understanding the Biological Clock: From Genetics to Physiology	July 8-12, 1995 Hanover, NH
APS Conference New Discoveries Within the Pancreatic Polypeptide Family: Molecules to Medicine	November 8-11, 1995 Newport Beach, CA
1996 Experimental Biology '96	April 14-18, Washington, DC
APS Conference pHysiology of Acid-Base Regulation: From Molecules to Humans	To Be Announced
APS Conference Neural Control of Breathing: Molecular to Organismal Perspectives	To Be Announced
APS Intersociety Meeting The Integrative Biology of Exercise	September 1996 Vancouver, British Columbia
<b>1997</b> Experimental Biology '97	April 6-10, New Orleans, LA

# **Council Meets in San Diego**

The Council met November 2-4, 1994, in San Diego, CA, in conjunction with the Intersociety Meeting "Regulation, Integration, Adaptation: A Species Approach." The primary purpose of the meeting was to focus on the Society's scientific meeting program, with an emphasis on the spring meeting. In order to provide for additional insights into the membership's perceptions of the Society's meetings, a random sample of members was surveyed (see page 17) and a number of committee representatives were invited to attend. Specifically, the Council was joined by Program Advisory Committee representatives from the sections and interest groups, members of the Program and Long Range Planning Committee, and several young scientists. As a result of these discussions, the Council has recommended that the APS remain part of a large multisociety interdisciplinary meeting in the spring and revise its format to address the needs of our membership. Brian Duling, APS President, highlights these recommendations in his Opinion piece on page 3.

During the meeting, Council received a report from the Membership Committee recommending that 84 regular and 29 corresponding candidates be approved for membership. It was also reported that as of October 14, 1994, the APS membership was 7,529, consisting of 5,604 regular, 845 emeritus, 32 honorary, 505 corresponding, 2 affiliate, and 541 student members. Council also approved the transfer of 65 regular members to emeritus status.

**Franklyn G. Knox,** Chair, Finance Committee, presented the 1995 budget to the Council for their review and approval. The preliminary budget projects income of \$11,251,414 and expenses of \$11,276,425, producing a deficit of \$25,011. After considerable discussion, the Council ap-



Attendees at first day of Council Retreat (1st row, 1-r): Patrick Tso, Elaine Gallin, David Wasserman, Michael Andresen, Jeff Sands, John Cuppoletti. (2nd row, 1-r): Austin Mircheff, Thomas Lohmeier, Carl Gisolfi, Heinz Valtin, Ethan Nadel, Celia Sladek, Hiroko Nishimura. (3rd row, 1-r): Charles Tipton, Brian Duling, Steven Wright, Frank Yin, Michael Hlastala, Thomas Nosek, David Bruce, David Brooks.

proved the 1995 budget, urging the Finance Committee to identify cost savings to eliminate the projected 1995 deficit.

The Council also considered several of the Society's award programs during the meeting. The recommendation of the Interim Awards Committee was accepted, and Council allocated funds to support 4 of 10 Research Career Enhancement Awards received for the August 15 deadline. Awards will be made to Neil Bradbury, Anthony Durmowicz, Lisa Freeman, and Michael Pagliassotti. The Interim Awards Committee also recommended that the Council consider expanding the APS/Genentech Postdoctoral Fellowship Award program in mammalian organ systems physiology by allocating funds from the Strategic Goals Fund. Of the 41 applications received for the first award, at least 25% were highly competitive applications, making the selection of one awardee extremely difficult. The Committee expressed the view that a continuation of the program was extremely important and urged the Council to explore the possibility that Genentech would be willing to fund an additional award or allow the Society to cost share the present award so that two Fellowships would be available to the community. It was agreed that the Council would consider the possible expansion of the program, discuss the suggestion with Genentech, and bring a recommendation to the Council in the spring. The Council also enthusiastically accepted the recommendation of the Daggs Committee that Earl Wood be awarded the 1995 Ray G. Daggs Award for contributions to physiology and the Society.

The Council unanimously approved the final draft of the "Conferee's Statement on Principles for the Use of Animals in Research and Education" that was approved by the FASEB Board and published in a previous issue of *The Physiologist* (vol. 37, no. 4).

Leonard Johnson reported that the Publications Committee has asked the journal editors to assume more responsibility for their budgets in order to help the Society contain section editors' expenses. In appreciation for their efforts, the editors and associate editors will be provided with a modest honorarium in keeping with the practices of a number of other scientific journals. Johnson also reported that starting January 1995, *APStracts* will be expanded to include the abstracts of all accepted journal manuscripts. To facilitate the expansion of *APStracts*, accepted manuscripts must be sent on disk or a charge of \$100 will be levied. The new policy will enable the Society to put all the abstracts on the Society's Gopher Information Server.

The next meeting of Council is scheduled for April 7-9, 12, 1995, in conjunction with the Experimental Biology '95 meeting in Atlanta, GA.

# **Research Career Enhancement Awards: Round 2**

At its November meeting, the Council accepted the recommendation of the Interim Awards Committee that 4 of 10 applications received for Research Career Enhancement Awards be approved for funding. The awards are designed to enhance the research careers of APS members in good standing, strengthening their research programs and making them more competitive scientists. The awards are given competitively twice a year with deadlines on February 15 and August 15. The recipients of the awards in Round 2 include Neil A. Bradbury, Anthony G. Durmowicz, Lisa C. Freeman, and Michael J. Pagliassotti.

The award to Neil A. Brabury, University of Alabama, Birmingham, will provide him with the opportunity to attend a specialized five-day GIBCO BRL Course on recombinant *Baculovirus* techniques. The course will enable him to learn how to produce quantities of both CFTR and alpha-adaptin to investigate the molecular interactions between the two.

Anthony G. Durmowicz, University of Colorado, Denver, will use the award to learn a novel reverse-transcription-PCR assay with which the mechanism of trophoelastin gene expression can be investigated in vivo. The techniques will be learned in the laboratory of William Parks, Washington University, over a 28-day period and applied to Durmowicz's studies on the regulation of pulmonary artery extracellular matrix protein expression.

Lisa C. Freeman, Kansas State University, Manhattan, will use the award for a three-month intensive research experience in the laboratory of John Adelman, Vollum Institute, to learn techniques to enable Freeman to combine experimental molecular biology and her existing strengths in classical ion channel biophysics and cardiac electrophysiology. The project will involve the extraction of SA node mRNA, characterization of the min K channel protein using PCR, protein and nucleotide sequencing of the protein, and construction of two-site-directed mutants.

The award to **Michael J. Pagliassotti**, University of Colorado, Denver, will be used to acquire the skills needed for the isolation and treatment of hepatocytes in culture and advanced molecular biological techniques in the laboratory of Stephen Clarke, Colorado State University. Pagliassotti's current research focuses on insulin regulation of glucose metabolism.

APS members in good standing are invited to apply for Research Career Enhancement Awards. The deadlines for application are February 15 and August 15.

### **Annual Teaching Section Dinner**

# Arthur C. Guyton Teacher of the Year Award

The annual dinner of the Teaching Section will feature the third annual Arthur C. Guyton Teacher of the Year Award, sponsored by the W.B. Saunders Company. Plan to attend this informal gathering and mix with your colleagues.

The dinner is Monday, April 10, at 6:30 pm at the Atlanta Marriott. The buffet dinner will include smoked salmon, vegetables, cheese, fruit, and beef kabobs. For tickets, send a check (made out to APS Teaching Section) for \$30 to Lois Jane Heller, Department of Medicine and Molecular Physiology, University of Minnesota, Duluth, MN 55812.

# **Experimental Biology '95**

## **Deadlines**

Advance Registration – February 24, 1995

Housing Reservations – March 3, 1995

# Meetings and Conferences APS Meeting Survey

In preparation for the Council retreat on scientific meetings held in November 1994 in San Diego, CA, the Society surveyed a random sample of 1,000 APS members. Surveys were sent to 500 APS Experimental Biology (EB) '94 meeting attendees and 500 APS nonattendees. Of the 1,000 members surveyed, 38.8% responded. The survey participants were asked to evaluate the EB Meeting and the APS Conferences.

#### **Demographics**

The respondent population could be characterized as having a PhD degree (73.8%), employed at an academic institution (81.1%), a member for more than 15 years (30.5%), and 41-45 years of age (20.2%). The primary sectional affiliation was the Cardiovascular Section (35%) followed by the Respiration Section (15.6%) and the Cell Section (9.3%).

#### **APS Conferences**

The APS Conference format is a relatively new meeting format that attracts only 150-300 attendees. When questioned about their attendance at the APS Conferences, 65.2% of the respondents indicated that they had not attended an APS Conference in the last five years. The majority of the respondents do not plan to attend any of the Conferences scheduled for the next two years. It should be noted that over 65% did not answer the question "Do you plan on attending any of the following APS conferences ...?" Of the respondents answering this question, 38.1% said they would only be attending the 1996 Intersociety Meeting on the Integrative Biology of Excrcise. Based on the survey results, it appears that the APS Conference program is not meeting the needs of the members (57.2%), and 56.6% of the respondents would like to see the program combined with a preexisting program such as the FASEB Summer Research Conferences.

Based on the responses received, it appears that the APS Conference Program should consist of two meetings per year (42.2%), with themes recurring every three years (39.2%). In addition, there was the strong recommendation that Intersociety meetings be held annually (83.4%). However, respondents were not asked if the Intersociety meetings should be held every two or three years.

### EB

The EB Meeting is considered to be the APS annual meeting by 89.4% of the respondents. The EB Meeting was attended by 89.6% of the respondents within the last five years and 85.4% plan to attend within the next two years. Of the respondents indicating that they have not attended within the last five years, 42.2% said they would attend within the next two years.

Of those members who attend the EB meeting, 57.2% remain at the meeting for 3-4 days, spending 2.5-3 days in the scientific sessions (43.5%). Attendees view the exhibit hall as an integral part of the meeting (72.9%), spending 3-5 hours in the hall (46.9%). Overall, 88.5% visit the exhibit hall, with most looking for products, not funding agencies. The placement service is used by 23% of the respondents, although 50% of the students responding do use the service.

Most respondents believe that the meeting should be an average of 3-4 days (50.3%), having no preference for or against Sunday sessions. The members come to the meeting for the scientific program, the speakers, the science, and interaction with other scientists. They have no interest in the APS Business meeting (38.7%) and are neutral about the section meetings. Most respondents agree that the "clustering" approach to programming (66.9%) is more beneficial than the "meeting within a meeting" approach. Most believe (62.4%) that APS should continue to sectionalize the programming.

Most of the respondents do not believe that the EB Meeting is too large: 74.4% indicated that size was not an inhibiting factor. However, of those who said that the EB meeting was inhibiting (25.6%), 89.5% said it was inhibiting because of size.

### **General Meeting Information**

At the end of the questionnaire, the respondents were asked to provide some general meeting information. When given a choice of meeting format, 26.2% prefer minisymposia and oral sessions, 18.0% prefer symposia, and 11.9% prefer poster sessions. The remaining respondents selected two or more of the above meeting formats. The respondents would be willing to attend sessions in the evening (58%). In addition, 52.4% would prefer a meeting that accepts all abstracts submitted regardless of content. Most (86.1%) of the respondents believe that the APS annual meeting should continue to be combined with a preexisting program such as EB. However, 55.5% believe that APS should vary the societies it meets with, suggesting that APS meet with the American Society for Pharmacology and Experimental Therapeutics, the Biophysical Society, the American Society for Biochemistry and Molecular Biology, and the American Society for Cell Biology.

The results of the survey were used by the Council to help them in their deliberations and contributed to the recommendations that are included in this issue (p. 3). APS members interested in receiving a copy of the survey results should contact Jacqueline McKee, APS Marketing Manager, at 301-530-7015 or via e-mail at lin@aps.mhs.compuserve.com.

# Experimental Biology '95 Atlanta, GA April 9–13, 1995

# **APS Distinguished Lectureships**

#### HENRY PICKERING BOWDITCH LECTURE



Barbara A. Block, Stanford University

"Regulation of Calcium Release in Muscle: The Role of the Ryanodine Receptor in Contraction and Thermogenesis"

Monday, April 10, 5:15 pm Convention Center, Rooms 264/265

#### PHYSIOLOGY IN PERSPECTIVE: WALTER B. CANNON MEMORIAL LECTURE (supported by The Grass Foundation)



Kenneth R. Chien, University of California, San Diego

"Cardiac Muscle Diseases in Genetically Engineered Mice: The Evolution of Molecular Physiology"

Wednesday, April 12, 5:15 pm Convention Center, Rooms 264/265

### Cardiovascular Section

### **ROBERT M. BERNE DISTINGUISHED LECTURE**



Harris J. Granger, Texas A & M University

"Regulation of Coronary Angiogenesis"

Wednesday, April 12, 8:30 am Convention Center, Rooms 264/265

## Cell & General Physiology Section HUGH DAVSON DISTINGUISHED LECTURE



Michael J. Berridge, University of Cambridge

"Spatiotemporal Aspects of Calcium Signalling"

Tuesday, April 11, 2:00 pm Convention Center, Room 260

#### Central Nervous System Section

### JOSEPH ERLANGER DISTINGUISHED LECTURE



**Donald J. Reis**, Cornell University Medical Center

"Central Neural Mechanisms That Protect the Brain From Hypoxia and Ischemia"

Tuesday, April 11, 8:30 am Convention Center, Room 261

## Comparative Physiology Section (Plenary Session) AUGUST KROGH DISTINGUISHED LECTURE



Jared M. Diamond, University of California, Los Angeles

"Quantitative Evolutionary Design of Physiological Systems"

Wednesday, April 12, 1:00 pm Convention Center, Rooms 264/265

## Endocrinology & Metabolism Section (Plenary Session) SOLOMON A. BERSON DISTINGUISHED LECTURE



Mladen Vranic, University of Toronto

"The Yin-Yang of Carbohydrate Metabolism"

Tuesday, April 11, 1:00 pm Convention Center, Room 261

## Environmental & Exercise Physiology Section EDWARD F. ADOLPH DISTINGUISHED LECTURE



Loring B. Rowell, University of Washington

"How Are Neural and Mechanical Effects on the Circulation Balanced During Exercise?"

Tuesday, April 11, 8:30 am Convention Center, Rooms 264/265

### Gastrointestinal Section

### HORACE W. DAVENPORT DISTINGUISHED LECTURE



Leonard R. Johnson, University of Tennessee

"Regulation of Gastrointestinal Mucosal Growth"

Monday, April 9, 2:00 pm Convention Center, Room 261 Neural Control & Autonomic Regulation Section (Plenary Session)

### CARL LUDWIG DISTINGUISHED LECTURE



Arthur D. Loewy, Washington University

"From Smokedrums to Viral Tracing: 150 Years of CNS Autonomic Research"

Monday, April 10, 11:45 am Convention Center, Rooms 264/265

#### **Renal Physiology Section**

#### CARL W. GOTTSCHALK DISTINGUISHED LECTURE



Steven C. Hebert, Harvard University

"The Na-Cl/Na-K-Cl Gene Family: Recent Advances in Our Understanding of the Biology of the Na-Cl-Coupled Cotransporters"

Wednesday, April 12, 8:30 am Convention Center, Room 360

#### **Respiration Section**

### JULIUS H. COMROE, JR. DISTINGUISHED LECTURE



Jack L. Feldman, University of California, Los Angeles

"From Molecules to Synapses to Networks to Breathing"

Wednesday, April 12, 2:00 pm Convention Center, Room 260

## Teaching of Physiology Section CLAUDE BERNARD DISTINGUISHED LECTURE



Howard S. Barrows, Southern Illinois University

"Problem-Based Learning: Rationale and Design"

Monday, April 10, 8:30 am Convention Center, Room 254

## Water & Electrolyte Homeostasis Section (Plenary Session) DISTINGUISHED LECTURE



**Pierre Corvol,** College of France, Paris

"Gene Variants of the Renin-Angiotensin-Aldosterone System: Implications in Cardiovascular and Renal Homeostasis in Humans"

Monday, April 10, 1:00 pm Convention Center, Rooms 266/267

# Third Annual Women in Physiology Mentoring Program and Reception

Atlanta Marriott Marquis Hotel, Monday, April 10, 1995, 6:30 pm

Featuring

L. Skidmore

Office of Science and Engineering Personnel National Research Council

"Women Scientists and Engineers Employed in Industry: Why So Few?"

To be followed by information and a brief update on the APS Women's Mentoring Program Sponsored by APS Women in Physiology Committee

## Experimental Biology '95 Atlanta, GA April 9-13, 1995

# Symposia

Workshop: Active Learning in Large Class Settings

Sponsor: APS Teaching of Physiology Section Chairs: D.R. Richardson and R.G. Carroll Sunday, April 9, 1:00-3:00 PM

- Preparing students to participate. H. Modell (Natl. Res. for Computers in Life Sci. Educat., Seattle, WA)
- Acting out muscle contraction. P. Hudson (Seattle Univ.)
- Mapping techniques for physiology. D.U. Silverthorn (Univ. of Texas, Austin)
- The use of discrete active learning exercises. R. Carroll (East Carolina Univ.)
- Use of combined andragogic and pedagogic methods. D. Richardson (Univ. of Kentucky)

#### Signal Transduction Theme

*Workshop:* Photorelease of Caged Compounds Applied to Physiological Systems

Sponsor: APS Education Committee Chair: J.H. Kaplan Sunday, April 9, 1:00-4:00 PM

- What are caged compounds? An introduction. J.H. Kaplan (Oregon Hlth. Sci. Univ.)
- Chemistry and photochemistry of caged compounds-practical considerations. G. Ellis-Davies (Oregon Hlth. Sci. Univ.)
- Smooth muscle regulation-what caged compounds can do. A.V. Somlyo (Univ. of Virginia, Charlottesville)
- Cardiac ion transport and excitability. W.J. Lederer (Univ. of Maryland)
- Ion channel regulation by intracellular messengers. D. Ogden (NIMR, London, UK)

#### Animal Care Symposium

Bringing Science to the People

Sponsor: Animal Care and Experimention and Education Committees, American Physiological Society and Committee on Care and Use of Research Animals, American Society for Pharmacology and Experimental Therapeutics

Chair: J.R. Haywood

Sunday, April 9, 2:00-5:00 PM

The importance of science education outreach programs. Donald Fraser (Univ. of Kentucky)

- How to talk with your neighbor about science. Beth Waters (Cooney/Waters Group, Inc.)
- The mini-medical school: establishing links with the community. Bruce Fuchs (Medical College of Virginia and NIH)
- The science museum: getting the scientist involved. E. Kay Davis (The Fernbank Museum of Natural History)

#### Epithelial Cell Biology Theme

*Workshop:* Localizing Extracellular Ion Flux With Vibrating Ion-Selective Probes

Sponsor: APS Comparative Physiology Section and Epithelial Transport Group

- Chairs: J.R. Demarest and P.J.S. Smith
- Sunday, April 9, 3:00-6:00 PM
- Vibrating probe techniques: principles, strengths and limitations. P.J.S. Smith (MBL, Woods Hole, MA)
- Proton secretion by mammalian epididymal cells. D. Brown (Harvard Med. Sch.)
- Polarized acid secretion from individual isolated *Necturus* gastric oxyntic cells. J.R. Demarest (Juaniata Col., Huntingdon, PA)
- Electrogenic potassium secretion by mammalian cochlear and vestibular epithelium. D.C. Marcus (Boys Town Natl. Res. Hosp., Omaha)
- Voltage-activated chloride current across mitochondria-rich cells of toad skin. W. Nagel (Univ. of Munich, Germany)
- Potassium and chloride transport by isopod hepatopancreatic ceaca and hind gut. J.C. Wright (Northern State Univ.)

Career Opportunities in Physiology

Sponser: APS Career Opportunities Committee Chair: J.P. Granger Sunday, April 9, 6:00-8:00 PM

- Career opportunities at National Institutes of Health. R. Geller (NHLBI, NIH)
- Career opportunities at National Aeronautics and Space Administration. R.J. White (NASA)
- Career opportunities in medical school basic sciences departments. J.E. Hall (Univ. of Mississippi Med. Sch.)
- Career opportunities in clinical departments. G.F. DiBona (Univ. of Iowa Coll. of Med.)
- Career opportunities in the pharmacological industry. T.J. Opgenorth (Abbott Labs.)

#### Epithelial Cell Biology Theme

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

Chairs: W.H. Dantzler and J.B. Pritchard Monday, April 10, 8:30-11:30 AM

- Membrane steps in renal tubular transport of organic anions. G. Burckhardt (Georg-August-Univ., Göttingen, Germany)
- Membrane steps in renal tubular transport of organic cations. S.H. Wright (Univ. of Arizona)
- Intracellular steps in renal tubular transport of organic anions and cations. D.S. Miller (NIEHS, Res. Triangle Pk., NC)
- Molecular and functional characteristics of renal sodium dicarboxylate transporters. A.M. Pajor (Univ. of Arizona)
- Molecular and functional characteristics of a renal organic cation transporter. H. Koepsell (Bayerische Julius-Maximilians-Univ., Würzburg, Germany)
- Unexpected role of organic anions in renal tubular transport of NaCl. P.S. Aronson (Yale Univ.)
- Role of p-glycoprotein in renal tubular transport of organic ions. P.D. Holohan (SUNY, Syracuse)

Role of Nitric Oxide in Physiological and Pathologic Function

Sponsor: Society for Experimental Biology and Medicine Chair: S.M. McCann Monday, April 10, 8:30-11:30 AM

Molecular properties of nitric oxide synthase. D. Brodt (UCSF)

- Nitric oxide and cyclic GMP signalling. F. Murad (Molec. Geriatrics Corp., Lake Bluff, IL)
- Role of nitric oxide in reproduciton. S.M. McCann (UT Southwestern Med. Ctr., Dallas)
- Nitric oxide as a neurotransmitter in the autonomic nervous system. K. Sanders (Univ. of Nevada, Reno)
- Nitric oxide and the endocrine pancreas, M.L. McDaniel (Washington Univ.)
- Nitric oxide and neuronal degeneration. V. Dawson (Johns Hopkins Univ.)

#### Cardiovascular Biology Theme

Cardiovascular-Renal Adaptations to Aging

Sponsor: APS Cardiovascular and Water & Electrolyte Homeostasis Sections Chairs: J.F. Reckelhoff and E.G. Lakatta

Monday, April 10, 8:30-11:30 AM

Cardiovascular adaptations to aging. E.G. Lakatta (Natl. Insts. on Aging)

Gender differences and renal aging. C. Baylis (West Virginia Univ.) Nitric oxide and aging. J.F. Reckelhoff (Univ. of Mississippi)

- Role of advanced glycosylation end products in renal and cardiovascular senescence. H. Vlassara (Picower Inst. of Med. Res., Manhassat, NY)
- Changes in gene expression on aging. V. Cristofalo (Med. Col. of Pennsylvania)

#### Metabolic Processes in Health and Disease

A Perspective on the History of Exercise Physiology

Sponsor: APS History of Physiology Group and Environmental & Exercise Physiology Section Chair: C.M. Tipton

Monday, April 10, 8:30-11:30 AM

- The early years and the "original" exercise physiologists. S.M. Tenney (Dartmouth Med. Sch.)
- Exercise physiology concepts from animal experiments. C.R. Taylor (Harvard Univ.)
- The European influences. P-O. Astrand (Karolinska Inst., Stockholm, Sweden)

The North American influences. C.M. Tipton (Univ. of Arizona)

Nitric Oxide Control of Renal Vascular and Tubular Interactions

Sponsor: APS Renal Physiology and Water & Electrolyte Homeostasis Sections

Chairs: L.G. Navar and J.P. Granger

- Monday, April 10, 2:00-5:00 PM
- Intrarenal localization of nitric oxide synthase isoforms and soluble guanylyl cyclase. R. Star (Univ. of Texas, Southwestern Med. Sch., Dallas)
- Nitric oxide control of renal microvascular function. S. Ito (Henry Ford Hosp.)
- Nitric oxide interactions with tubuloglomerular feedback. W. Welch (Georgetown Univ.)

Role of nitric oxide in control of renal medullary circulation. D. Mattson (Med. Col. of Wisconsin)

- Actions of nitric oxide on epithelial transport. B. Stoos (Henry Ford Hosp.)
- Nitric oxide in the mediation of pressure natriuresis. D. Majid (Tulane Univ.)
- Nitric oxide, kidney function and hypertension. J. Granger (Univ. of Mississippi)

#### Cardiovascular Biology Theme

Role of Myosin Isoforms in Smooth Muscle Function

Sponsor: APS MyoBio (Muscle) Group Chairs: R.J. Paul and R.A. Murphy Monday, April 10, 2:00-5:00 PM

- Role of myosin isoforms: unique issues in smooth muscle. R.A. Murphy (Univ. of Virginia, Charlottesville)
- Characterization of isoform diversity in smooth muscle and nonmuscle myosin heavy chains. C.A. Kelley and R. Adelstein (NIH)
- Myosin isoforms are markers of smooth muscle growth and differentiation. M. Periasamy (Univ. of Cincinnati)
- Isoforms of the 17 kDa smooth muscle light chain: tissue distribution, potential function, and analysis of the murine gene. D. Hathaway (Indiana Univ., Krannert Inst.)
- Modulation of contractility by myosin C-terminal heavy chain isoforms. R.J. Paul and S. Cai (Univ. of Cincinnati)
- Estrogen and smooth muscle myosin heavy chain isoforms. A.F. Martin (Univ. of Illinois, Chicago)
- Vascular muscle myosin heavy chains and light chains in essential hypertension, C.S. Packer (Indiana Univ.)
- Myosin isoform heterogeneity in smooth muscle: distribution in single cells. T. Eddinger (Marquette Univ.)

#### **Respiratory Biology Theme**

Hemoglobin-Based Oxygen Carrying Solutions: Physiologic Responses

Sponsor: APS Liaison With Industry Committee Chair: K.E. Burhop Monday, April 10, 2:00-5:00 PM

- Hemoglobin based oxygen carrying solutions: an overview of their properties, safety, clinical uses, and status. K. Burhop (Baxter Healthcare Corp.)
- The efficacy of hemoglobin solutions in treating perfusion deficits in swine. J. McKenzie (USUHS)
- Effect of hemodilution with hemoglobin solutions on focal cerebral ischemia in rats. D. Cole (Loma Linda Univ.)
- Role of endothelin, nitric oxide, and adrenergic mechanisms in the pharmacologic effects of hemoglobin solutions on systemic hemodynamics and regional circulation in rats. A. Gulati (Univ. of Illinois, Chicago)
- The effects of hemoglobin solutions on microvascular blood flow, oxygenation, and cell/cell interactions as assessed by intravital fluorescence microscopy in the skin and muscle of hamsters. D. Nolte (Inst. for Surgical Res., Munich, Germany)
- Contractile effects of hemoglobin solutions on isolated blood vessels. S. Muldoon (USUHS)

### Metabolic Processes in Health and Disease Theme

Nutrition and Exercise: Physiological Regulators of Reproductive Function?

Sponsor: APS Endocrinology & Metabolism and Environmental & Exercise Physiology Sections Chair: J.L. Cameron Monday, April 10, 2:00-5:00 PM

- Nutrition and exercise as physiological regulators of gonadotropin secretion in nonhuman primates. J.L. Cameron (Univ. of Pittsburgh)
- Short-term effects of nutrition and exercise on gonadotropin secretion in women. A.B. Loucks (Ohio Univ.)
- Nutritional cues as regulators of puberty onset. D.L. Foster (Univ. of Michigan)
- Pathways transmitting metabolic information to the reproductive axis. G.N. Wade (Univ. of Massachusetts)
- Individuals particularly sensitive to metabolic regulation of reproductive function. M.P. Warren (St. Lukes-Roosevelt Hosp., New York)

#### **Respiratory Biology Theme**

The Impact of Locomotion on Ventilation in Tetrapods

- Sponsor: APS Comparative Physiology, Respiration, and Environmental & Physiology Sections
- Chairs: D.F. Boggs, D.R. Carrier, and D.M. Bramble
- Tuesday, April 11, 8:30-11:30 AM
- Running and breathing in lizards: implications for early tetrapods. D. Carrier (Brown Univ.)
- Locomotion and ventilation in horses. P.J. Butler and A.J. Woakes (Univ. of Birmingham, UK)
- Interaction between muscle properties, elastic properties and inertia in breathing while running. I.S. Young and R.M. Alexander (Univ. of Leeds, UK)
- Canine locomotor-respiratory dynamics: implications for mammalian respiratory design and function. D.M. Bramble, F.A. Jenkins, Jr., and R. Simons (Univ. of Utah and Harvard Univ.)
- Impact of flight kinematics on respiratory mechanics, breathing pattern and respiratory muscle activity in pigeons and magpies. D.F. Boggs, K.P. Dial, F.A. Jenkins, Jr., and D. L. Kilgore, Jr. (Univ. of Montana and Harvard Univ.)
- Is ventilation independent of locomotion? Flow measurements in men, horses and starlings. R.B. Banzett (Harvard Univ.)

#### Metabolic Processes in Health and Disease Theme

Use of Transgenic Animal Models to Study Hormone Action

Sponsor: APS Endocrinology & Metabolism and Environmental & Exercise Physiology Sections

Chair: S.A. Camper Tuesday, April 11, 8:30-11:30 AM

- Hormonal regulation of transgene expression in pituitary gland. S.A. Camper (Univ. of Michigan)
- Targeted oncogenesis in transgenic mice: immortalized neuroendocrine cell lines. P.L. Mellon (UCSD)
- Altering adipose tissue function in transgenic mice. S.R. Ross (Univ. of Pennsylvania)

- Regulation of the growth hormone gene cluster by a locus control region. N.E. Cooke (Univ. of Pennsylvania)
- Transgenic approaches to sexual differentiation. K.L. Parker (Duke Univ.)
- Inducible, tissue-specific expression of antisense RNA in transgenic mice: targetting G-proteins regulating differentiation and development. C.C. Malbon (SUNY, Stony Brook)

#### Cardiovascular Biology Theme

Estrogenic Regulation of Vascular Function

Sponsor: APS Cardiovascular Section Chairs: V.M. Miller and L.A. Fitzpatrick Tuesday, April 11, 8:30-11:30 AM

- Estrogens, endothelial cell differentiation and angiogenesis. H.W. Schnaper (Northwestern Univ.)
- Genomic regulation of nitric oxide synthase. D.G. Harrison (Emory Univ.)
- Estrogen receptors in vascular smooth muscle: what are they doing? D. Losordo (Tufts Univ.)
- Estrogen modulation of the endothelins: transcription, receptors and calcium regulation. V.M. Miller and G. C. Sieck (Mayo Clin. & Fndn.)
- Hormones, ion channels, and resistance arteries. M.T. Nelson (Univ. of Vermont)
- Estrogens, matrix proteins and calcification of coronary arteries. L.A. Fitzpatrick (Mayo Clin. & Fndn.)

#### Epithelial Cell Biology Theme

Molecular Physiology of Gap Junction Channels

Sponsor: APS Cell & General Physiology Section, Epithelial Transport Group, and Central Nervous System Section Chair: D.C. Spray

Tuesday, April 11, 8:30-11:30 AM

- Gap junctions in health and disease: what the channels do and how they do it. D.C. Spray (Albert Einstein Col. Med.)
- Gap junctions and tissue invasion: a comparison of tumorigenesis and pregnancy. E. Winterhager (Univ. of Essen, Germany)
- Functional consequences of gap junction gene manipulation: Charcot-Marie-Tooth Syndrome and negative dominant mutations. D.P. Paul (Harvard Univ.)
- Permeation of gap junction channels: conductance, selectivity and tissue function. P.B. Brink (SUNY, Stony Brook)
- Where are the gates on gap junction channels? G. Dahl (Univ. of Miami)

Gap junction involvement in secretion. P. Meda (Univ. of Geneva, Switzerland)

Cytoplasmic Transport of Lipids and Inorganic Ions

Sponsor: APS Gastrointestinal Section Chairs: R.A. Weisiger and F. Bronner Tuesday, April 11, 8:30-11:30 AM

- Role of membrane vesicles in cytoplasmic transport. J.M. Crawford (Harvard Univ.)
- Role of membrane binding in cytoplasmic transport. J. Storch (Rutgers Univ.)
- Mechanistic aspects of cytoplasmic transport. W.D. Stein (Hebrew Univ., Jerusalem, Israel)
- Influence of cytoarchitecture on cytoplasmic transport. K. Luby-Phelps (UT Southwestern Med. Ctr., Dallas)
- Cytoplasmic transport of calcium and other inorganic ions. F. Bronner (Univ. of Connecticut)
- Cytoplasmic transport of lipids: role of binding proteins. R.A. Weisiger (UCSF)

#### Epithelial Cell Biology Theme

Mechanisms of Water Flow Across Biological Membranes

Sponsor: APS Epithelial Transport Group Chairs: M.L. Zeidel and H.W. Harris Tuesday, April 11, 8:30-11:30 AM

- Low permeability apical membranes of barrier epithelia. M.L. Zeidel (Univ. of Pittsburgh)
- The aquaporins, a new class of water channel proteins. P. Agre (Johns Hopkins Univ.)
- Aquaporin-CD and aquaporin-3, molecular structure of collecting duct water channels. F. Marumo (Univ. of Tokyo, Japan)
- Trafficking of water channels in ADH-responsive epithelia. H.W. Harris (Harvard Univ.)

Regulation of water channels. M.A. Knepper (NIH)

#### Cardiovascular Biology Theme

Leukocyte-Endothelial Cell Interactions

Sponsor: North American Society for Biorheology Chairs: D.A. Hammer and M. Lawrence Tuesday, April 11, 8:30-11:30 AM

- Biophysics of selectin-mediated interactions. T.A. Springer (Harvard Med. Sch.)
- Selectin ligands and their derivatives: structure-function activity studies leading to drug design. B.K. Brandley (Glycomed, Inc.)
- Physicochemical determinants of leukocyte-endothelial interactions under flow. D.A. Hammer (Cornell Univ.)
- Molecular mechanisms of lymphocyte adhesion under hydrodynamic flow. L.V. McIntire (Rice Univ.)
- Shear dependence of leukocyte adhesion to peripheral addressin. M. Lawrence (Univ. of Virginia, Charlottesville)
- Leukocyte-endothelium adhesion in the microcirculation. H. Lipkowsky (Pennsylvania State Univ.)

Physiology of Hyperammonemic Encephalopathy

Sponsor: APS Central Nervous System Section Chairs: R. Hawkins and R.F. Butterworth Tuesday, April 11, 2:00-5:00 PM

Brain metabolism during chronic hyperammonemia. R. Hawkins (Finch Univ. Hlth. Sci./Chicago Med. Sch. )

Astrocytes in hyperammonemia. M. Norenberg (Univ. of Miami)

- Pathological effects of ammonia on synaptic transmission. W. Raabe (Univ. of Minnesota)
- Neurotransmission deficits in hyperammonemic states. R.F. Butterworth (Univ. of Montreal)

Cerebral dysfunction in inherited hyperammonemic syndromes: prospects for gene therapy. M. Robinson (Children's Hosp. of Philadelphia)

#### **Respiratory Biology Theme**

Oxygen Flux: Biologic Consequences of Adhering to Biophysical Principles

Sponsor: APS Hypoxia Group and Respiration Section Chairs: R.W. Hoyt and T.E.J. Gayeski Tuesday, April 11, 2:00-5:00 PM

Sites of O<sub>2</sub> diffusion resistance inferred from whole muscle studies. P.D. Wagner (UCSD)

Cellular O<sub>2</sub> requirements: effects of mitochondrial distribution and respiratory control. D.P. Jones (Emory Univ.)

Effect of cell free oxygen carriers on oxygen delivery to tissues. R.M. Winslow (UCSD)

- ATP homeostasis and oxygen delivery. R.J. Connett (Monroe Comm. Col., Rochester, NY)
- Quantitative anatomy of muscle capacity for O<sub>2</sub> flux: basic relationships and plasticity. O.A. Mathieu-Costello (UCSD)

Metabolic control strategies in skeletal muscle in response to challenges to ATP homeostasis. H.J. Green (Univ. of Waterloo)

Where are the PO<sub>2</sub> gradients within muscle? Biologic consequences of the biophysical space that oxygen must traverse. T.E.J. Gayeski (Univ. of Rochester)

#### Epithelial Cell Biology Theme

Role of Mesangial Cell Ion Transport in Glomerular Physiology and Disease

Sponsor: APS Epithelial Transport Group, Renal Physiology and Water & Electrolyte Homeostasis Sections

Chairs: B.N. Ling and S.C. Sansom

Tuesday, April 11, 2:00-5:00 PM

- $Ca^{2+}$  and  $Ca^{2+}$  related signalling pathways in glomerular mesangial cells. J.V. Bonventre (Harvard Mcd. Sch.)
- Regulation of phospholipase A<sub>2</sub> in mesangial cells in health and disease. K.L. Skorecki (Univ. of Toronto, Hosp. for Sick Children)

- Role of chloride ion in glomerular mesangial cells. K. Kurokawa (Univ. of Tokyo, Japan)
- Ca<sup>2+</sup>-activated, K<sup>+</sup> channels: regulation of mesangial cell membrane potential. S.C. Sansom (Univ. of Texas Med. Sch., Houston)

Regulation of mesangial ion channels by insulin and glucose: role in diabetic nephropathy. B.N. Ling (Emory Univ.)

#### Neurobiology Theme

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

Sponsor: APS Central Nervous System and Cardiovascular Sections

Chairs: M.L. Blair and L.D. Van de Kar

Tuesday, April 11, 2:00-5:00 PM

- CNS pathways mediating cardiovascular regulation of vasopressin. L. Renaud (Univ. of Ottawa)
- Role of the paraventricular hypothalamus nucleus in cardiovascular homeostasis. M.L. Blair (Univ. of Rochester)
- Forebrain pathways and the behavioral interactions with neuroendocrine and cardiovascular function. B. Bohus (Univ. of Groningen, The Netherlands)
- Central pathways mediating stress-induced renin release. L.D. Van de Kar (Loyola Univ., Chicago)

Role of dorsomedial hypothalamus in stress-induced cardiovascular changes. J.A. DiMicco (Indiana Univ.)

Forebrain pathways in the regulation of fluid balance. A.K. Johnson (Univ. of Iowa)

#### Cardiovascular Biology Theme

Neural Control of the Circulation in Heart Failure and Coronary Ischemia

Sponsor: APS Neural Control & Autonomic Regulation, Central Nervous System, and Cardiovascular Sections Chair: I.H. Zucker

Wednesday, April 12, 8:30-11:30 AM

- Altered myocardial adrenergic receptor signal transduction in heart failure. D.E. Vatner (Harvard Med. Sch. and New England Reg. Primate Res. Ctr.)
- Reflex control of sympathetic nerve activity from skeletal muscle in humans with heart failure. L.I. Sinoway (Pennsylvania State Univ., Hershey Med. Ctr.)
- Renal sympathetic nerve activity in heart failure: role of the paraventricular nucleus. K.P. Patel (Univ. of Nebraska)
- Prostaglandins mediate vagal reflexes in heart failure. T.H. Hintze (New York Med. Col.)
- Cardiac vagal afferent stimulation by free radicals during ischemia and reperfusion. H.D. Schultz (Univ. of Nebraksa)
- Cardiac sympathetic afferent reflexes during ischemia: role of adenosine. M.D. Thames (Case Western Reserve Univ.)

#### Cell Injury, Inflammation and Repair Theme

Sickle Cell Interactions with Endothelium: Implications for Vascular Pathology

Sponsor: Biomedical Engineering Society Chairs: T.M. Wick and J.R. Eckman Wednesday, April 12, 8:30-11:30 AM

- Sickle cell retinopathy in mouse and man. G.A. Lutty (Johns Hopkins Univ.)
- Molecular mechanisms regulating vascular tone in sickle patients. D.V. Faller (Boston Univ.)
- The role of procoagulant factors in sickle cell interactions with endothelium under flow conditions. V.T. Turitto (Univ. of Memphis)
- Biophysical measurements of sickle cell interactions with endothelium. P.A. Smolinski, J.R. Eckman, and T.M. Wick (Georgia Inst. of Tech. and Emory Univ.)
- Differential cytokine regulation of receptor-mediated young red blood cell adhesion to endothelial cells under flow. L.V. McIntire (Rice Univ.)
- Red cell deformability and adhesion to endothelium as determinants of vaso-occlusive episodes in sickle cell disease. H.H. Lipkowsky (Pennsylvania State Univ.)
- Melanocortin Receptor Structure and Signalling: Neural, Pigmentary and Immunomodulatory Functions
- Sponsor: APS Endocrinology & Metabolism and Central Nervous System Sections

Chairs: J.B. Tatro and L. Roselli-Rehfuss

Wednesday, April 12, 8:30-11:30 AM

- Functional organization of the melanocortin hormonal and neural systems. J.B. Tatro (Tufts Univ. and New England Med. Ctr.)
- Molecular biology of the melanocortin receptor family. L. Roselli-Rehfuss (Inst. for Clin. Res., Montreal)
- Structure-function relationships in melanocortin receptor-mediated transmembrane signalling. I. Gantz (Univ. of Michigan)
- Molecular genetics of melanocortin receptor function and pigmentary control. R.D. Cone (Vollum Inst. for Advanced Biomed. Res. and Oregon Hlth. Sci. Univ.)
- Design of synthetic and receptor subclass-specific melanocortins. V.J. Hruby (Univ. of Arizona)
- Central and peripheral immunomodulatory actions of melanocortins. J.M. Lipton (UT Southwestern Med. Ctr., Dallas)

#### **Respiratory Biology Theme**

Central Nervous System Control of Respiration: Role of Gamma Aminobutyric Acid and Excitatory Amino Acids

Sponsor: APS Respiration and Central Nervous System Sections Chairs: A.M. Taveira da Silva and N.S. Cherniack Wednesday, April 12, 8:30-11:30 AM

- Neurobiology and pharmacology of GABA and excitatory amino acid receptors. A. Guidotti (Georgetown Univ.)
- Mechanisms of respiratory rhythm generation. J.L. Feldman (UCLA)
- Role of excitatory amino acid transmission in the generation of respiratory rhythm. D.F. Speck (Univ. of Kentucky)
- CNS GABAergic mechanisms regulating central respiratory activity. H. Kazemi (Harvard Med. Sch.)
- GABAergic and excitatory amino acids mechanisms regulating respiratory pattern. R.A. Gillis (Georgetown Univ.)
- Role of gamma aminobutyric acid and excitatory amino acids in the modulation of respiration during hypoxia. N.H. Edelman (UMDNJ-Robert Wood Johnson Med. Sch.)

#### **Respiratory Biology Theme**

Oxygen Metabolism, Gene Expression and Cellular Function

Sponsor: APS Respiration Section

- Chairs: L. Clerch and D. Massaro
- Wednesday, April 12, 8:30-11:30 AM
- Metabolites of oxygen: cellular sources and rates of production. E. Cadenas (Univ. of Southern California)
- Physiological functions of oxygen's metabolites. B. Fanburg (New England Med. Ctr.)
- Antioxidant enzyme gene expression: transcriptional regulation. Y.-S. Ho (Wayne State Univ.)
- Antioxidant enzyme gene expression: post-transcriptional regulation. L. Clerch (Georgetown Univ.)
- Signal transduction in the regulation of antioxidant enzyme gene expression. D. Massaro (Georgetown Univ.)
- Function of extracellular-superoxide dismutase. S. Marklund (Umea Univ. Hosp., Stockholm)

#### Signal Transduction Theme

Role of Cyclic ADP-Ribose in Cellular Regulation

Sponsor: APS Renal and Cell & General Physiology Sections Chair: T.P. Dousa

Wednesday, April 12, 8:30-11:30 AM

- Fundamentals of cyclic ADP-ribose signalling pathway. H.C. Lee (Univ. of Minnesota)
- Regulation of cyclic ADP-ribose synthesis. A. Galione (Oxford Univ., UK)
- Regulatory role of cyclic ADP-ribose in pancreatic islets. H. Okamoto (Tohoku Univ., Japan)
- Metabolism of cyclic ADP-ribose: are metabolic bifunctional enzymes the rule? M.K. Jacobson (Univ. of Kentucky)
- Cyclic ADP-ribose in renal cells: metabolism and regulation. T.P. Dousa (Mayo Clinic)

#### Epithelial Cell Biology Theme

Function, Characteristics and Regulation of Volume-Sensitive Ion Channels

Sponsor: APS Epithelial Transport Group, Cell & General Physiology and Water & Electrolyte Homeostasis Sections
Chair: K. Strange
Wednesday, April 12, 2:00-5:00 PM

- Mechanosensitive ion channels: are they involved in cell volume regulation? H. Sackin (Cornell Univ. Med. Col.)
- Molecular and biophysical characteristics of a large conductance mechanosensitive channel from *E. coli.* S. Sukharev (Univ. of Wisconsin)
- Molecular physiology of cytoskeleton-ion channel interactions: possible role in cell volume regulation. H. Cantiello (Mass. General Hosp. and Harvard Med. Sch.)
- Volume-sensitive organic osmolyte efflux: a new role for anion channels. K. Strange (Children's Hosp. and Harvard Med. Sch.)

Cloning and molecular characterization of the volume-sensitive anion channel I<sub>Cln</sub>. M. Paulmichl (Univ. of Innsbruck, Austria)

Multiple pathways for regulation of a shrinkage-activated cation channel. D. Nelson (Univ. of Chicago)

#### Signal Transduction Theme

Role of Ca<sup>2+</sup> in Stimulus-Response Coupling

Sponsor: APS Cell & General Physiology Section and Epithelial Transport Group

Chair: J.R. Dedman

Wednesday, April 12, 2:00-5:00 PM

- Cyclic ADP-ribose: a modulator of  $Ca^{2+}$ -induced  $Ca^{2+}$  release. H.C. Lee (Univ. of Minnesota)
- Regulation and structure of Ca<sup>2+</sup> pumps. J. Penniston (Mayo Fndn.)
- Regulation of cellular function by Ca<sup>2+</sup>/calmodulin-dependent protein kinases. A. Nairn (Rockefeller Univ.)
- Protein kinase Cs and their binding proteins in normal and transformed cells. S. Jaken (W. Alton Jones Cell Science Center, Inc., Lake Placid, NY)
- Ca<sup>2+</sup> homeostasis in the cardiac myocyte: the role of phospholambam. E. Kranias (Univ. of Cincinnati)
- Regulation of membrane events by the annexins. M.A. Kaetzel (Univ. of Cincinnati)

The annexins of *C. elegans*. C.E. Creutz (Univ. of Virginia, Charlottesville)

Osmotic Regulation of Gene Expression

Sponsor: APS Cell & General Physiology Section Chair: M.B. Burg Wednesday, April 12, 2:00-5:00 PM

- Osmotic regulation of proU transcription in *E. coli*. C. Higgins (Oxford, UK)
- Osmotic regulation of gene expression in renal cells. A. Garcia-Perez (NIH)
- Molecular basis of osmotic regulation of transporters. H.M. Kwon (Johns Hopkins Univ.)
- Osmotic regulation of heat shock and early response genes. S.R. Gullans (Harvard Med. Sch.)
- Osmotic regulation of genes involved in the complications of diabetes. P.D. Killen (Univ. of Michigan)

#### Metabolic Processes in Health and Disease Theme

Cellular and Molecular Signals Governing Energy Transduction During Exercise

Sponsor: APS Environmental & Exercise Physiology and Cardiovascular Sections

Chair: S.S. Segal

Wednesday, April 12, 2:00-5:00 PM

- Motor unit recruitment: onset of the exercise stimulus. A.J. Fuglevand (John B. Pierce Fndn. Lab., New Haven, CT)
- Regulation of glycogen turnover in humans: insight from NMR studies. G.I. Shulman (Yale Univ.)
- Molecular signals governing mitochondrial respiration and proliferation. D.A. Essig (Univ. of South Carolina)
- Humoral, paracrine, and physical signals governing capillary exchange. D.A. Williams (Univ. of Missouri)
- Determinants of oxygen supply and utilization in exercising muscle. M.C. Hogan (UCSD)

#### Cardiovascular Biology Theme

- New Developments in the Mechanisms of Regulation on the Cerebral Circulation
- Sponsor: APS Cardiovascular and Central Nervous System Sections

Chair: H.A. Kontos

Wednesday. April 12, 2:00-5:00 PM

- Cellular and ionic mechanisms of signal transduction in cerebral arterial muscle. D.R. Harder (Med. Col. of Wisconsin)
- Flow regulation of cerebral vascular tone. J.A. Bevan (Univ. of Vermont)
- Peroxynitrite and other oxidants in cerebral ischemia. J.E. Beckman (Univ. of Alabama at Birmingham)
- Polypeptides and nitric oxide in cerebral vascular regulation. M.A. Moskowitz (Mass. General Hosp.)
- Vascular effects of excitotoxic amino acids. F.M. Faraci (Univ. of Iowa)

#### Cardiovascular Biology Theme

- Endothelin Receptors: Role in Renal Function and Dysfunction
- Sponsor: APS Liaison with Industry Committee and Water & Electrolyte Homeostasis Section
  Chair: D.P. Brooks
  Thursday, April 13, 8:30-11:30 AM
- Endothelin receptor subtype expression in normal and diseased kidneys. P. Nambi (SmithKline Beecham Pharmaceuticals)
- Signalling pathways activated by endothelin receptor subtypes. M.J. Dunn (Case Western Reserve Univ.)
- Endothelins, renal tubule synthesis and actions. D.E. Kohan (Univ. of Utah)
- Role of endothelin in renal function and dysfunction in vivo. D.P. Brooks (SmithKline Beecham Pharmaceuticals)
- Endothelin is a key modulatory of progressive renal injury: experimental data and novel therapeutic strategies. A. Benigni (Mario Negri Inst. of Pharmacol. Res., Bergamo, Italy)

#### **Respiratory Biology Theme**

Pro-Inflammatory and Anti-Inflammatory Peptides

Sponsor: APS Respiration Section Chairs: S.I. Said and E.T. Wei Thursday, April 13, 8:30-11:30 AM

- Mystixins: novel anti-inflammatory peptide agonists. H.A. Thomas (Univ. of California, Berkeley)
- Anti-inflammatory properties of melanocyte-stimulating hormone. J.M. Lipton (Univ. of Texas Southwestern Med. Ctr., Dallas)

- Pro-inflammatory peptides in sensory nerves of the airways. D.M. McDonald (UCSF)
- Tachykinin receptors in inflammation. D.C. Regoli (Univ. of Sherbrooke, Quebec, Canada)
- Tachykinin antagonists. C.A. Maggi (A. Menarini Pharmaceuticals, Florence, Italy)
- Protection by vasoactive intestinal peptide against myocardial ischemia-reperfusion injury. D.K. Das (Univ. of Connecticut, Farmington)
- Anti-inflammatory actions of VIP in the lungs and airways. S.I. Said (SUNY, Stony Brook)

#### Epithelial Cell Biology Theme

- Urea Transporters: Genetic and Physiologic Regulation in Kidney, Erythrocytes, and Vasculature
- Sponsor: APS Renal Physiology and Cell & General Physiology Sections

Chair: J.M. Sands

Thursday, April 13, 8:30-11:30 AM

- Role of urea transport in the urine concentrating mechanism. M.A. Knepper (NIH)
- Urea transport in erythrocytes: its importance to cell function and its relationship to the Kidd antigen. R.B. Gunn (Emory Univ.)
- Microvascular transport of urea in the renal medulla. T.L. Pallone (Pennsylvania State Univ.)
- Regulation of transepithelial urea transport across the collecting duct. J.M. Sands (Emory Univ.)
- Molecular cloning and regulation of a urea transporter from kidney. M.A. Hediger (Harvard Med. Sch.)
- Cloning and functional expression of HUT11, a human urea transporter from bone marrow cells. P. Ripoche (CEA, Saclay, France)

# Current Legislative Issues in the Use of Animals in Biomedical Research

Tuesday, April 11, 12:00–1:00 PM Georgia World Congress Center, Room 360

A discussion sponsored by the APS Animal Care and Experimentation Committee

# Experimental Biology '95 Atlanta, GA April 9-13, 1995

# **Sections Special Functions**

### Cardiovascular

Dinner Tuesday, April 11, 6:30 PM Marriott, Marquis IV

### **Cell and General Physiology**

Steering Committee Tuesday, April 11, 12:00 Noon Convention Center, Rm. 273

Banquet and Lecture Tuesday, April 11, 6:30 PM Hilton, Douglas/Paulding

### **Central Nervous System**

Steering Committee Monday, April 10, 7:30 AM Marriott, Summit

Reception Tuesday, April 11, 6:00 PM Marriott, Sydney

### **Comparative Physiology**

Steering Committee Monday, April 10, 12:00 Noon Convention Center, Rm. 271

Business Meeting, Social, Scholander Awards Monday, April 10, 5:15 PM Marriott, Sydney

### Endocrinology and Metabolism

Steering Committee Monday, April 10, 11:00 AM Convention Center, Rm. 273

Business Meeting Tuesday, April 11, 6:30 PM Marriott, Summit Social Tuesday, April 11, 7:00 PM Marriott, Consulate

### Environmental and Exercise Physiology

Dinner Tuesday, April 11, 6:30 PM Marriott, London/Zurich

### Gastrointestinal

Steering Committee Monday, April 10, 7:30 AM Marriott, Stockholm

Dinner Tuesday, April 11, 5:30 PM Marriott, Bonn

### **History of Physiology**

Lecture Sunday, April 9, 7:00 PM Marriott, Summit

## Neural Control and Autonomic Regulation

Reception Wednesday, April 12, 6:00 PM Marriott, Sydney

### **Renal Physiology**

Steering Committee Tuesday, April 11, 7:30 AM Marriott, Consulate

Distinguished Lecturer Luncheon Tuesday, April 11, 12:00 Noon Marriott, Trinidad

Dinner Wednesday, April 12, 7:00 PM Peasant Restraurant, Club Room

### Respiration

Steering Committee Wednesday, April 12, 7:30 AM Marriott, Calgary

Business Meeting Wednesday, April 12, 12:00 Noon Marriott, Bonn

Dinner Wednesday, April 12, 6:30 PM Scitrek Science Museum

### **Teaching of Physiology**

Steering Committee Tuesday, April 11, 7:30 AM Marriott, Stockholm

Business Meeting Tuesday, April 11, 6:00 PM Marriott, State

Reception Monday, April 10, 11:30 AM Convention Center, Rm. 261

Dinner Monday, April 10, 6:30 PM Marriott, Bonn

## Water and Electrolyte Homeostasis

Steering Committee Monday, April 10, 7:30 AM Marriott, Trinidad

Luncheon and Business Meeting Tuesday, April 11, 11:30 AM City Grill Restaurant

# Experimental Biology '95 Atlanta, GA April 9-13

Animal Care and Experimentation Sunday, April 9, 7:30 AM Marriott, Calgary

**Career Opportunities** Tuesday, April 11, 12:00 Noon Convention Center, Rm. 275

**Committee on Committees** Sunday, April 9, 12:00 Noon Marriott, Calgary

Education Monday, April 10, 7:30 AM Marriott, Madrid

International Physiology Wednesday, April 12, 12:00 Noon Convention Center, Rm. 271

# **Committee Meetings**

Liaison With Industry Wednesday, April 12, 7:30 AM Marriott, Madrid

Long-Range Planning Monday, April 10, 12:00 Noon Convention Center, Rm. 253W

Membership Tuesday, April 11, 7:30 AM Marriott, Trinidad

**Porter Physiology Development** Tuesday, April 11, 12:00 Noon Convention Center, Rm. 253W

**Program** Tuesday, April 11, 12:00 Noon Convention Center, Rm. 271 Program Advisory Sunday, April 9, 12:30 PM Marriott, Stockholm/Copenhagen

**Program Advisory** Wednesday, April 12, 12:00 Noon Convention Center, Rm. 253W

Public Affairs Monday, April 10, 4:00 PM Convention Center, Rm. 258W

Section Advisory Sunday, April 9, 12:00 Noon Marriott, Madrid

Women in Physiology Tuesday, April 11, 7:30 AM Marriott, Madrid

# **Publications Special Functions**

### Journal Editorial Boards

Group Meeting Sunday, April 9, 4 PM Marriott, Bonn

Advances in Physiology Education Editor and Associate Editors Wednesday, April 12, 7:30 AM Marriott, Amsterdam

AJP: Cell Physiology

Editor and Associate Editors Monday, April 10, 7:30 AM Marriott, Calgary

### AJP: Endocrinology and Metabolism

Editor and Associate Editors Tuesday, April 11, 7:30 AM Marriott, Copenhagen

#### AJP: Gastrointestinal and Liver Physiology

Editor and Associate Editors Monday, April 10, 12:00 Noon Marriott, Amsterdam AJP: Heart and Circulatory Physiology Editor and Associate Editors Monday, April 10, 7:30 AM Marriott, Copenhagen

AJP: Lung Cellular and Molecular Physiology Editor and Associate Editors Tuesday, April 11, 12:00 Noon Marriott, Calgary

AJP: Regulatory, Integrative and Comparative Physiology Editor and Associate Editors Tuesday, April 11, 7:30 AM Marriott, Summit

Journal of Applied Physiology Editor and Associate Editors Monday, April 10, 7:30 AM Marriott, Amsterdam Clinical Physiology Series Book Committee Tuesday, April 11, 7:30 AM Marriott, Calgary

Handbook Committee Tuesday, April 11, 7:30 AM Marriott, Amsterdam

History of Physiology Book Committee Monday, April 10, 12:00 Noon Marriott, Calgary

**Technical Series Book Committee** Monday, April 10, 12:00 Noon Marriott, Copenhagen

NIPS Joint Managing Board Tuesday, April 11, 12:00 Noon Marriott, Amsterdam

# **Integrative Study Group to Meet**

A few years ago the Long-Range Planning Committee of the American Physiological Society suggested that the next revolution in biology would be in the integrative domain. They stated that physiology "needed to become identified as a unique branch of biology which deals with synthesis and integration, and ultimately seeks to understand the functioning of whole organisms..." (Giebisch et al., *The Physiologist* 33: 161-180, 1990).

To facilitate steps in this direction, a study group, "Integrative Study" (previously "Integrative Study in Physiology and Medicine"), was formed by members of the APS at the Experimental Biology '94 meeting held in Anaheim. At the upcoming Experimental Biology '95 meeting in Atlanta, the Integrative Study Group has scheduled five meetings. These meetings will be open to all scientists with an interest in integrative dimensions of physiology and biology. An organizational meeting will be held Sunday evening, 7-9 PM. A series of integrative study dialogues (no lectures) are scheduled Monday through Thursday from 7:30 to 8:30 AM.

Sunday	Introductions; the many meanings of integrative study
Monday	On the nature of integrative study
Tuesday	On the integrative matrix of the cell and multicellular organism: what binds the parts into wholes?
Wednesday	On the cell as an integrated system
Thursday	On principles of organization: feedback
	cycles, hierarchies, etc.

Because of the nature of integrative study, participants can attend any of the meetings without feeling the necessity of attending all of them. We hope that you will come on Sunday evening and to as many of the mornings as possible. For further information, contact the group chairman, Roger Thies, Department of Physiology, University of Oklahoma Health Science Center, Oklahoma City, OK 73190; phone: 405-271-2226; FAX: 405-271-3181.

# Education

# **APS** Participates in Seek Out Science Contest

The Seek Out Science Contest, aimed at children in grades 4-8 in the Washington, DC, area, was recently sponsored by AAAS, WJLA-TV's "We're On Your Side for Education" campaign, and several local businesses. The competition was developed to encourage childrens' interest in and knowledge about science and technology occupations.

Students were asked to form teams, interview a person who worked in a science and/or technological field, and write a project paper. Students' papers had to address a variety of issues—what the interviewee does in his/her job, what makes the job fun, why he/she chose the particular job, and why the work is important. The APS acted as one of eleven contact societies for the contest; children contacted the APS Education Department to help them identify a local physiologist who would be willing to be interviewed for the report.

The grand prize for the students with the best report is an all expenses paid trip to Hawaii. While there, winners will watch scientists set up the international broadcast of the 1995 JASON project. Following the tour, the winning team will make a presentation at school discussing their experiences on the trip and present the sponsors of the Seek Out Science Contest with a formal report. Other prizes include computers, technical tours of Washington's Kennedy Center and the WJLA-TV studios, tickets for a special family science night at the Smithsonian Air and Space Museum, and gift certificates.

A national outreach project with a similar objective that is also coincidentally called "Seek Out Science" (SOS) is being spearheaded by WGBH Television, the Boston-area PBS affiliate. The project is not a contest but an educational tool designed to generate interest in science occupations at the middle and high school levels. SOS particularly focuses on women in science. In the spring of 1995, WGBH will air a new six-part series on notable women scientists called "Discovering Women." An instructional SOS Activity Guide for teachers and students has also been compiled as a supplement to the television series, and it provides information on how to implement the SOS project. The guide is available around the country through local PBS affiliates or WGBH.

Students involved in the WGBH SOS project will research and interview women scientists in all fields. In this process, they will be exposed to a variety of experiences and personal stories, which will broaden their concepts of science, give them an idea of what such careers entail, and break down stereotypes. Women working in the sciences can make lasting impressions on students, promoting their interest in science and in related careers. APS members who are interested in participating should contact their local PBS station for information or contact WGBH directly at 617-492-2777.

# Membership

# **News From Senior Physiologists**

## Letter to Helen Tepperman

In response to the annual report of the Committee on Senior Physiologists, Piero Foa writes, "Assisting public schools with scientific activities is most rewarding. Children love to build circulation models out of familiar household objects such as plastic bottles, rubber bulbs, and valves from fleet enemas, while a pulsating heart from a pithed frog not only serves to demonstrate the effects of drugs and ions, but will also start an animated discussion about biologic and ethical issues related to brain death and organ transplants. Other useful props are an X-ray of my chest, a chart or two, a few plastic models and the heart and lungs of a pig. Cash-onthe-line and a nod from the meat inspector is all one needs to get a 'pluck' from the local slaughter house. I hadn't heard that word before and learned from my dictionary that is means 'the heart, liver, lungs, and windpipe of a slaughtered animals."

"Being taken out of mothballs once a year for a few endocrinology lectures to the freshman class keeps me on my toes, reading the literature and attending weekly seminars. Mostly, I try to understand the complexities of molecular biology. Occasionally, I try to serve as a link to the past by pointing out that a paper on the Journal Club list describes old experiments either conveniently forgotten or just ignored because published before the advent of Medline. How often must the wheel be discovered?"

## Letter to Robert Grover

Gaetan Jasmin writes, "I am still an active researcher keeping abreast with molecular pathology, more specifically regarding heart and skeletal muscle genetic membrane defects. I am working with the so-called K openers with two papers in preparation. My professional activities also include human pathology in a pediatric University Hospital."



# Letter to Brian Duling

Arthur W. Martin writes, "Last week I received a little memento of my 50 year membership in the APS, with a very nice letter from you. It has been both an honor and a pleasure to be a member of this fine Society and to have been of very modest service to the Society years ago. I have very happy memories of my colleagues of those days: Myerson, Landis, Katz, Bard, Daggs, et al. I was concerned when the more democratic method of electing a President went into effect. I well remember those grueling Business Meetings of the Society to elect the new officers. After going through such an election process I could well understand the devotion of the new President to his service to the Society. But the new election procedure has not resulted in any catastrophes, and we still get wonderful service from our elected officers."

## Letter to John Blinks

G. Edgar Folk, Jr., writes, "The nicest thing which has happened in many years was to have received the Honor Award from the Environmental and Exercise Physiology Section. This action was very inspiring and encouraging; since it happened I seem to be getting to the office earlier than before."

"I am doing each week just about what I did 20 years ago. About one-half of my time goes to the administration of a flourishing Center for Global Research. We are financed for ten years from 1992 onward. One facet is a project at our field station on my farm, 17 miles away. Two very stimulating graduate students are working with me on a micrometeorological study."

"Another segment of time is taken in refereeing manuscripts and research grants. Also, we recently held a national and international conference here in Iowa City on Global Climatic Research. Now we have 25 manuscripts to edit and publish."

"Each year I have a very refreshing change because of leading a group of approximately ten alumni from this university to a tour of Antarctica. Three times I have 'sung for my supper' by lecturing on these tours. There will certainly be another one in January. Fortunately, I am getting some research data out of each trip because of studying the same island where there was a crash in the penguin population. My major interest now in polar science is concerned with the food chain in the Arctic and the Antarctic Oceans, the Ozone Hole, and especially the way that fat metabolism fits into this picture."

# Chapter News Ohio Physiological Society News

Physiologists from across Ohio met in Columbus on September 30, 1994, for the 9th annual meeting of the Ohio Physiological Society (OPS) held at the Ohio State University Health Sciences Center. Martin Frank, the Executive Director of the APS, was among the distinguished guests at the meeting. The scientific program included poster presentations of research in a variety of the subdisciplines of physiology and a symposium on neuroimmunophysiology. In the symposium, Ronald M. Glaser discussed the psychological basis of brainimmune system interactions, and he was followed by Caroline C. Whitacre, who spoke on oral immunologic tolerance to neural antigens and applications of the basic science of oral tolerance in rational therapy for degenerative neurological disease. Bradford T. Stokes presented recent findings on involvement of inflammatory mediators in spinal cord injury and recovery, and Richard C. Rogers talked on the cytokine messages involved in immune signaling in the central nervous system. Jackie D. Wood ended the symposium with a discussion of neuroimmune communication in the gastrointestinal tract. Items of business taken up during the meeting included chapter status in the APS, a vote to fill the office of president-elect, the 1995 meeting, and support for the 1995

Ohio State Science Day. The membership voiced unanimous approval of a proposal to apply for recognition as a chapter of the APS. Patricia J. Metting, a cardiovascular physiologist at the Medical College of Ohio, was named president-elect and designated as the organizer of the 1995 OPS Meeting to be held at the Medical College of Ohio in Toledo on September 28-29, 1995. The meeting in Toledo will mark the 10th anniversary of the OPS and will include honors for Peter K. Lauf of the Wright State University School of Medicine, who was the first president of OPS and the host for the first meeting of the Society on May 7, 1986, in Dayton. Continued involvement of the OPS in supporting and participating in the activities of Ohio State Science Day was strongly encouraged. Ohio State Science Day is a statewide fair where high school and middle school students exhibit their science projects. Participation of OPS in judging the fair and offering special achievement awards is viewed as a contribution to education of the students and teachers about physiology as a scientific discipline basic to medicine and many other areas of the life sciences.

> Jackie D. Wood President, The Ohio Physiological Society

# Submissions to the Journal of Applied Physiology

When **submitting** a manuscript to the *Journal of Applied Physiology*, please include the manuscript on disk to enable the APS Editorial Office to electronically transmit the manuscript to the editor for facilitation of the review process.

# IMPORTANT

#### **Disk Requirements**

If your manuscript is **accepted** for publication in the research journals of The American Physiological Society, you must send a disk containing the final revised, accepted version of the paper and a statement certifying that the version of the disk is identical to the accepted manuscript.

If a disk is not sent, a charge of \$100 will be levied (for 1995 submissions). The \$100 charge will be used to offset the extra typesetting costs associated with the publication of paper manuscripts. The receipt of a disk also enables the Society to include the abstract of the article (with author permission) in advance of print publication in *APStracts*, a copyrighted electronic journal available on the Society's Gopher Information server.

# **Public** Affairs

# FASEB Calls for Boost in NIH Dollars

NIH funds should be increased by 10% next year to seize opportunities presented by research advances, FASEB President **Sam Silverstein** told a Washington news conference. This was a key recommendation of the recent FASEB consensus conference on research funding. Representatives of the FASEB member societies met in Bethesda, MD, in October 1994 to review research programs and policies at eight federal agencies and to make recommendations for federal FY 1996 spending on biomedical and related life sciences. Silverstein released the report at the December 15 news conference.

The FASEB conferees argued in the report that support for biomedical research is an investment in the future health and prosperity of the country. The discoveries made through this research enable our citizens to live longer, healthier, more active, and productive lives, and they also make a significant contribution to the nation's economy. The report noted that basic biomedical research is one of the most cost-effective investments we can make because it offers high-quality, longterm employment for more than one million people in science and related career areas. Furthermore, the emphasis in all federally funded biomedical research programs should be on investigator-initiated, peer-reviewed research because that gives the nation its best assurance that high-quality science will be performed.

Key recommendations in the report include the following.

- NIH should be provided with \$12.459 billion in FY 1996, or a 10% increase overall. However, research project grants should be increased by 14% so NIH can fund a larger percentage of the best among the new, unsolicited research grants. The conferees concurred with the National Research Council recommendation that the current number of basic biomedical science trainees should be maintained at the present level while stipends should be increased to \$12,000 for predoctoral trainees and \$25,000 for postdoctoral trainees.
- The Biological Sciences Directorate of the NSF should increase the number and size of its grants during the next five years. As a first step, in FY 1996 the directorate should be provided with \$389 million in FY 1996 so that it can award 2,950 grants with an average size of \$110,000.
- The medical and prosthetic research program at the VA should be provided with at least \$296 million in FY 1996 to take advantage of more research opportunities. This represents an 8.8% increase over the FY 1995 appropria-

tion of \$272 million. During the last decade, the budget for VA research has not even kept pace with inflation.

- NASA Life Sciences research should be restored to its FY 1994 level of \$53.8 million. Funding for NASA-NIH collaborative research should be increased from \$15 to \$20 million. The conferees commended the improvements NASA has made in its peer-review mechanisms and its collaborations with NIH. They therefore recommended that all life sciences research activities be transferred to the Life and Biomedical Sciences and Applications Division.
- In a more general recommendation, the report urged that funds for the construction of research facilities be awarded through competitive, peer-reviewed grant programs rather than through congressional earmarking of appropriations bills.

Copies of the FASEB Consensus Conference report are being sent to all Members of Congress. To obtain a copy, contact the FASEB Office of Policy Analysis and Review at 301-530-0657. The report is also available electronically on the FASEB gopher under Public Policy Statements and Reports.

# What Lies Ahead on Capitol Hill?

The November election produced a major upheaval in the political landscape. While the implications of Republican control of both Houses of Congress are many and complex, cutting government spending to cut taxes and reduce the federal deficit is one of the dominant themes to emerge. However, it should be noted that even before the election returns were in, the trend toward spending cuts and deficit reduction was already in place.

NIH itself is not generally seen to be one of the agencies at great risk for budget cuts. Nevertheless, given the bidding war to cut spending, funding increases for biomedical research are likely to be small at best, and there will be an ongoing risk that across-the-board cuts may be imposed.

The Republican "Contract With America" did not include explicit statements about how they would fund their various initiatives, but one list of potential cuts that made the rounds targeted two areas important to biomedical research. The list included proposals to limit funding increases at the NSF to 1% less than the rate of inflation (projected savings: \$350 million over five years) and to fix the indirect cost reimbursement rate at 46% (projected savings: \$1.6 billion over five years).

The other significant change is the arrival of another large cohort of new Members of Congress. Given the uncer-

tainties about how the new Congress will proceed, this is a good time for APS members to let their elected representatives know what you as a voter think our national priorities ought to be. Take the time today to write letters to your Representatives and Senators asking them to support biomedical research at the NIH. Write to your Representative in care of the US House of Representatives, Washington, DC 20515 and to your Senators in care of the US Senate, Washington, DC 20510.

The APS has also recently initiated NetAlert, a quick-response network to let physiologists know when Congress and the Administration are dealing with issues critical to biomedical research. For more information, or to participate in NetAlert, contact APS Public Affairs Officer Alice Hellerstein at 301-530-7105 or send e-mail to netalert@aps.mhs. compuserve.com.

# **Coronado Activist Freed on Bail**

A Kalamazoo judge freed one-time fugitive animal rights activist Rodney Coronado on bail December 22, 1994. Coronado had been extradited to Michigan in late November to face federal charges in connection with a 1994 Animal Liberation Front arson attack at Michigan State University (MSU). Coronado was captured in Arizona in September after spending 14 months in hiding.

Bail is usually granted unless a suspect poses a flight risk or is a danger to the community, according to Assistant US Attorney Tim VerHey, who is a member of the prosecution team that won grand jury indictments against Coronado. Coronado was not considered dangerous to the community, but to ensure that he does not flee again, Judge Richard Enslen required Coronado's parents to pay a \$50,000 cash bond and provide deeds to various family-owned properties as part of a \$650,000 surety bond. After his release, Coronado returned to the Arizona Pascua Yaqui Indian Reservation, where he was living under an assumed name prior to his capture.

Coronado is accused of setting a fire that destroyed the office of an MSU animal science professor, causing \$200,000 worth of damage and wiping out 35 years of research on nutrition and the decline of the natural mink population. Ten years of another professor's research was also destroyed in blaze. Coronado has pleaded not guilty to five charges, including arson, extortion, possession of stolen property, and using fire to commit extortion. Coronado was twice denied bail while imprisoned in Arizona. His trial was scheduled to begin January 23, 1995, but his lawyer has filed a motion to delay it until March.

# Third Appeal on Monkeys Does Not Move Court

The Supreme Court for the third time refused to hear an appeal by animal activists concerning the so-called "Silver Spring Monkeys," thus apparently closing the door on the last opportunity for animal activists to prolong the dispute over the macaques. At issue was a continuing effort by People for the Ethical Treatment of Animals, the International Primate Protection League, and other activist groups to obtain control over the animals that were stolen in 1981 from the Institute for Behavioral Resources in Silver Spring, MD.

The Supreme Court's November 28, 1994, action confirms the validity of a ruling by the Fifth US Circuit Court of Appeals that dismissed the activists' suit because they lacked legal "standing" or interest to sue on the primates' behalf. The suit, which was originally filed in Louisiana state courts under state animal welfare laws, alleged that Tulane University was mistreating the macaques. Despite the plaintiffs' objections, Tulane University had the case transferred from state to federal court on the grounds that the university was acting as an agent of the NIH in caring for the animals. The Supreme Court's refusal to hear the case also resolved any question about Tulane's right to have made that jurisdictional change from state to federal court.

The two earlier cases involving the Silver Spring Monkeys that were appealed to the Supreme Court concerned efforts to gain direct custody over the animals and to prevent the necessary euthanasia of certain animals in the group.

# More Legal News on Animals

Time ran out in November 1994 for the Animal Legal Defense Fund (ALDF) and its codefendants to ask the Supreme Court to overturn lower court rulings about USDA regulation of rats, mice, and birds under the Animal Welfare Act (AWA) and the status of the current AWA rules governing dog exercise and the psychological well-being of primates. Since no appeals were filed, rats, mice, and birds will not be covered, and the existing performance-based regulations for dog exercise and psychological well-being of primates will be allowed to stand. APS participated in amicus curiae briefs in both cases.

Meanwhile, on another legal front, the ALDF failed in an effort to use the courts to halt the work of the National Academy of Sciences (NAS) panel charged with revising the NIH Guide for the Care and Use of Laboratory Animals. The NAS's Institute of Laboratory Animal Resources (ILAR) has assembled a panel of experts to revise the NIH Guide, but the ALDF sued the Department of Health and Human Services because it claims that the ad hoc panel is in fact an extension of NIH and should be subject to the requirements of the Federal Advisory Committee Act (FACA). That law requires a balanced representation of all public views on advisory committees and open public access to their deliberations.

However, on October 25, 1994, a federal court denied an ALDF motion for a preliminary injunction to halt the NIH guide revision while the suit is being resolved. Both the federal government and the NAS (which was not originally named in the suit but asked to intervene as a defendant) argued that the ILAR committee was not established or utilized by the government. The court refused to grant the injunction because the ALDF had not yet shown that it was likely to succeed in making its legal case that FACA rules should apply to the guide revision committee.

# Embryo Research Plan Generates Controversy

Even as NIH moved in early December, 1994, to accept guidelines for federal funding of certain kinds of human embryo research, President Clinton flatly blocked one of the most controversial types of this research. Meanwhile, abortion opponents have vowed to halt government involvement in all human embryo experiments.

Human embryo research had been on hold since the 1980s due to policies put in place under the Reagan and Bush administrations. The 1993 NIH Revitalization Act authorized NIH to proceed with in vitro fertilization experiments, so in January 1994 NIH Director Harold Varmus convened a Human Embryo Research Panel to determine what kinds of experiments NIH should fund and what guidelines should be put in place for the conduct of this research.

The panel announced its recommendations on September 27, 1994, and they were accepted by the Advisory Committee to the NIH Director on December 2, 1994, after a two-day public hearing. With the stated goal of finding guidelines "that would be acceptable public policy based on reasoning that takes account of generally held public views regarding the beginning and development of human life," the panel recommended that NIH permit research on ex utero, preimplantation embryos up to 14 days of age that were produced using in vitro fertilization techniques. The 14-day standard is

used in several other nations that permit embryo research, including Canada, Spain, Sweden, and the United Kingdom. Australia, Austria, Denmark, France, Germany, Norway, and Switzerland either prohibit embryo research entirely or strictly limit it.

The 14th day is significant because this is about when the first sign of the nervous system, known as the primitive streak, appears. The panel said NIH should make an exception and allow research beyond the 14th day for certain protocols, such as those intended to reliably identify the appearance of the primitive streak.

The panel said that most embryo research should be conducted on leftover embryos donated by couples who have undergone in vitro fertilization. However, some embryos could be produced specifically for research when there is no other way to accomplish particularly important work. Specifically cited were research concerning oocyte maturation and on the fertilization process itself. It was this category, embryos produced explicitly for research, that President Clinton banned in an announcement that occurred on the same day that the Advisory Committee to the NIH Director accepted the panel's recommendations.

Meanwhile abortion opponents were swift to announce their opposition to the entire set of guidelines. The NIH panel's report explained that it had given consideration to various views about the embryo research and had concluded that it could be justified "within a framework of stringent guidelines" based upon an "assessment of the moral status of the preimplantation embryo." The panel's assessment of that status was that "although the preimplantation human embryo warrants serious moral consideration as a developing human life, it does not have the same moral status as infants and children."

Opponents saw it otherwise. "This is not another tissue experiment," wrote David Walsh, chairman of the Politics Department of Catholic University, on the op-ed page of the *Washington Post* of October 27, 1994. "We are talking about the development of a genetically unique member of the human species for experimentation and destruction."

On December 5, 1994, a coalition of 70 organizations announced a petition drive to ask Congress to ban all human embryo experiments. At a news conference announcing the petition drive, Michael Schwartz of the Life Advocacy Alliance stated that embryo research is "ethically indistinguishable from what went on in the [Nazi] death camps" of World War II.

# **Society Mixer**

The APS Mixer (cash bar) will be held in the Marriott, Marquis I, on Sunday, April 9, beginning at 9:00 pm. Come and enjoy the delicious desserts and dance the evening away.

# **Friend-Raising for Biomedical Research**

by Mary Woolley President, Research!America

This article is based on remarks delivered to the Annual Retreat of the Association of Chairmen of Departments of Physiology, December, 1994.

Whither funding for biomedical research in the 104th Congress? Considering that the Contract With America does not so much as mention the words "health" or "research," it is evident that achieving increased appropriations for the NIH will be a formidable challenge to the research community and its allies. That's the bad news. The good news is that despite the current emphasis on cutting taxes and reducing or eliminating government programs, the public is allied with the research community in believing that medical research should be a higher national priority. The challenge is to build on and activate that public belief: the challenge is to friend-raise for research.

Before describing ways to friend-raise for research, it is important to review the evidence for the statement that the public believes that research should be a higher national priority. Periodic national and regional public opinion polls commissioned by Research!America have consistently shown very high levels of public support—9 in 10 Americans say they think support for medical research should be increased, and between 60 and 78% (depending on the mechanism suggested) are willing to personally pay more to assure that medical research receives more support. The mean response to a question exploring just how much more support is appropriate reveals that Americans think it makes sense to at least double the level of support for medical research in this country (1).

# ..."9 of 10 Americans say they think support for medical research should be increased..."

A *Times Mirror* poll conducted in December 1994 underscores the high level of support Research!America has for years reported for medical research, ranking increased funding for AIDS research third on a list of fourteen diverse programs, including education, crime, the homeless, and defense, that are important to Americans. The *Times Mirror* poll also reveals deeply contradictory views: citizens want to cut the federal budget and reduce the deficit at the same time that they want to sustain or increase support for many high priority programs including research (2). Researchers ought to play an active role in resolving this contradiction in favor of research. The only way we will see funding for research increase is to get involved in making the case. Researchers must participate in public debate wherever and whenever we can! Given the strength of popular support for medical research, researchers need not feel hesitant in making the case for research and should not back down when decision makers suggest that research may be important but not as important as, say, dealing with crime. I suggest countering that particular suggestion with the following statistic: in 1975, the nation spent about \$5 billion on the penal system and about the same amount on medical research (funding from all sources com-

# ..."we should concentrate on friendraising, rather than fund-raising, for medical research"

bined); in 1995, the nation will spend \$300 billion on the penal system and about \$30 billion on medical research (3). Are prisons really ten times more important than medical research to the future of the US? If we can summon the dollars to fund more prisons, why can't we fund more research?

Although I strongly recommend a "don't blink and don't back down" response to arguments we hear from those who resist appropriating more funding for medical research, I don't advocate stimulating a confrontation about dollars. Confrontation is not the best approach to accomplishing our objective of serving the public's interest by making medical research a much higher national priority. Rather, with so many new faces in Congress, we should concentrate on friend-raising, rather than fund-raising, for medical research.

Like the citizens they represent, new (and many continuing) members of Congress are not likely to know very much about medical research. Research!America's surveys have found that only 1-12% of the population can identify NIH as the federal agency that funds most taxpayer-supported medical research (4). (It is interesting to note that there is considerable variation in NIH recognition from state to state even though there is a consistent percentage, about 12%, of citizens who say they or someone in their immediate family works in a health or health research-related occupation.)

It is imperative that researchers come forward now to introduce themselves to their elected representatives and to the staff members who work with their representatives. It is important to underscore the fact that researchers, like elected representatives, are working in the public interest and are in fact fellow public servants. It is also important to let representatives know that taxpayer dollars are at work in her/his district, directly and indirectly supporting many good jobs and many small and large businesses as well as funding research that will contribute to a higher quality of life for every constituent. Members of the research community should be resources to elected officials, available as experts to answer research-related questions and available as evidence that taxpayer dollars are being well spent.

It is also important to listen and learn from elected representatives and their staff what their issues are; what needs they have for information; and to respond to these, making links to medical research wherever possible and to researchintensive institutions like universities, hospitals, and businesses. As elected officials get to know and count on researchers for information and support, it is only natural that researchers will have an influence on appropriations and regulations that affect our enterprise. But we have to keep in mind that this is a two-stage process, in which friend-raising comes first, before fund-raising!

Friend-raising, also known as advocacy, is an easy and natural human endeavor, not nearly as demanding or disciplined as science. The challenge of advocacy is a communications challenge. It responds to the principles and tools of communication rather than to the principles and tools of the scientific method. (This fact doesn't mean that scientists can't be advocates, as convenient a rationalization as this has been for many scientists for many years!) A first principle of advocacy is that, to be effective, messages must be tailored to the audience. One size does not fit all when it comes to advocacy for research, any more than it does in other venues. For the same reason that there are different television ads on during "Oprah" and during "Monday Night Football," Research! America features different messages delivered by different messengers when we work in North Carolina and in New York City and when we work in schools in distinction to retirement communities. We study survey results and listen to focus groups as we choose messages and messengers for a particular venue; the generic version of this principle is to learn how to identify with the intended audience; to be sure to align your values with those of the audience (even if the audience is one person); and to remember to anticipate, listen, and respond to questions and concerns.

Another principle of advocacy is that advocacy is not the same as education. Education is important, and everyone in the research community should be serving as an educator and/or a resource to educators so that every citizen of any age can be assured access to high-quality science and math education. But participation in education should be seen as distinct from advocacy. It may be convenient and satisfying to think of advocacy as a kind of public education, but it is a disservice to educated people to do so: advocacy is much more akin to public relations, to influencing attitudes and opinion, than it is akin to education, which is about asking questions and understanding the distinction between objectivity and emotion. Advocacy is more often than not effective only when it comes from the heart as well as from the head. Researchers need to put more heart into advocacy if we want it to work. In focus groups, people tell Research!America they want to hear at least as much caring as information from researchers and clinicians.

Another very simple principle we have to keep in mind if we are going to be effective advocates is the principle of accountability. If you're using somebody else's money, it is incumbent upon you not only to be accountable but to convey accountability. Whether you work with tax, investment, consumer, or philanthropic dollars, odds are that you, the researcher, are working with somebody else's money. But odds also are that you don't often think about the importance of

# "Surely, if research is given the chance to deliver, everyone's interests will be served"

reporting in to your boss. Thinking of your fellow citizen as your employer means rejecting the concept that the public or its elected or appointed representatives are patrons of science. It means understanding and talking as though researchers work in the public's interest. It also means listening rather than lecturing, getting into the questions and answers, and letting the boss know that her/his confidence in you is wellplaced.

How can Research!America help would-be advocates? In addition to conducting direct-to-the-public advocacy on behalf of medical research via public service and paid advertisements, posters and brochures, and our 800 number, Research!America provides tools for members of the research community to use in their advocacy efforts. Results of our commissioned public opinion surveys make effective enclosures in letters to elected officials and as attention-getting facts in op-ed pieces and letters to the editor. Our regional programs of matching volunteer researchers to elementary school classrooms and adult retirement or civic groups provide an easy way to get involved as a resource to the community, personalizing and reinforcing the value the public attaches to medical research. Our Mail to the Chief tailored letter-writing campaigns available for professional society meetings make it easy for researchers to get involved in regular communication with decision makers, raising friends for research.

It is time that the research community took the pledge to become advocates. A great deal of effective friend-raising for research can take place if every researcher devotes just four hours a month to this activity. Every researcher should consider it a responsibility to get to know elected officials who represent them and who share with them a responsibility to the public they serve. Every researcher should write a thank you letter to their elected representatives when she/he receives federal funding, pointing out the economic as well as life-enhancing benefits of the tax dollars being spent in that district and state. Every researcher should insist that her/his department, institution, professional, and scientific societies are conducting active, effective friend-raising programs for research making it possible for every member of the research community to lend a hand and raise a voice for research. Every researcher in a leadership role among her/his colleagues should take steps to destigmatize advocacy and begin immediately to formally and informally recognize and reward those who participate in public outreach and advocacy. Every researcher who has doubts about the value, methods, or potential outcomes of advocacy should take the responsibility to identify, discuss, and debate those doubts and should endeavor to overcome barriers to believing and acting as though she/he believes that the public really does support research. Every researcher should learn to listen to members of the public. Every researcher should make use of the currently available tools of advocacy and then develop more and share them widely with colleagues. Every researcher should be aware of the public's respect for researchers, and every researcher should share the public's pride in research. Every researcher should respect public advocates for research, and every researcher should take pride in their own advocacy for research.

If all researchers become advocates for research, we will indeed raise friends for research, and our many friends among the public will join with us to raise the funds we need to let scientific opportunity, rather than status quo economics, drive research. Surely, if research is given the chance to deliver, everyone's interests will be served.

- 1. Research! America commissioned surveys: Medical Research and Health Care Concerns: A Survey of the American Public, Louis Harris and Associates, 1993: Surveys of the Citizens of North Carolina, 1993 FGI of Chapel Hill: Surveys of the Citizens of Metropolitan New York City, 1993 and 1994, The Taylor Group; Survey of the Citizens of Kentucky 1994, VCU Survey Research Laboratory.
- 2. *Times Mirror Center for the People and the Press*, News Release, Washington, DC, December 5, 1994.
- 3. Holmes, S. A. Prison boom is busting budgets. San Francisco Examiner, November 6, 1994, p. A4; NIH Data Book 1976, p. 11 and 14; NIH Data Book 1994, in press.
- 4. Op cit.

# **APS Sustaining Associate Members**

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**Daryl D. Buss** has moved to the University of Wisconsin, accepting the position of Dean of the School of Veterinary Medicine, Madison, WI. Prior to his new position, he was with the University of Florida, Gainesville.

Formerly with the Department of Biology, Middle Tennessee State University, Murfreesboro, Michele L. Barnard has accepted a position with the Pulmonary Research Laboratory, Michael Reese Hospital, Chicago, IL.

Susan M. Smith has accepted a position with the Oregon Regional Primate Center, Beaverton. Previously, she was with the Department of Physiology, University of Pittsburgh School of Medicine, Pittsburgh, PA.

Moving from the Department of Physiology and Biophysics, University of Lund, Sweden, Eliete Bouskela has relocated to the Laboratory of Microcirculation and Research, State University of Rio de Janeiro, Brazil.

**Christian W. Zauner** is now with the Department of Exercise and Sport Science, Oregon State University, Corvallis. His previous position was with Health and Human Performance, East Carolina University, Greenville, NC.

Moving from the Department of Physiology and Biophysics, University of Vermont, Burlington, William Halpern has accepted a position with Living Systems Instrumentation, Inc., Burlington, VT.

**B. Stanley Willenbring** has joined the Department of Pharmacology and Physiology, Oklahoma State University, Tulsa. Prior to his new assignment, he was affiliated with the Department of Physiology, Dartmouth Medical School, Hanover, NH.

# **People and Places**

Anthony C. Chao has been with the Alza Corporation since the fall of 1994. Prior to his new assignment, he was with the Department of Molecular Pharmacology and Medicine, Stanford University, Stanford, CA.

Having moved from the Department of Anesthesiology, University Medical School, Ulm, Germany, **Peter L. Radermacher** is presently with the Department of Anesthesiology, Heinrich Meine University, Dusseldorf, Germany.

**Raymond E. Ideker** recently moved from the Department of Pathology, Duke University Medical Center, Durham, NC, to the University of Alabama, Birmingham.

John H. Dirks has relocated to Karachi, Pakistan, on a three-year leave from the Department of Medicine, University of Toronto, Ontario, Canada. Mail for Dirks should be directed to the University of Toronto.

Now with the Physical Therapy and Exercise Department, State University of New York, at Buffalo, **Gaspar A. Farkas** recently moved from the Mayo Clinic, Rochester, MN.

Hong Y. Luo has accepted a new position with the Department of Laboratories, Cornell Medical College, Manhasset, NY. Prior to this, he was with the Department of Physiology and Biophysics, University of Louisville, Louisville, KY.

Recently, Corresponding Member Michio Arakawa joined the Public Welfare Department, Insurance Division, Gifu, Japan. Before his new appointment, he was with the Gifu University School of Medicine, Gifu, Japan. **Michael S. Hedrick** has moved from the University of Wisconsin School of Veterinary Medicine, Madison, to the Department of Bioscience, California State University, Haywood.

Accepting a position with the Department of Physiology, Lake Erie College of Osteopath Medicine, Erie, PA, **Philip B. Hultgren** has moved from Kirksville College of Osteopath Medicine, Kirksville, MO.

Joseph R. Vasselli has accepted a position with the Obesity Center, St. Luke's-Roosevelt Hospital Center, New York, NY. Prior to this appointment, he was with the Pharmaceutical Division, Miles, Inc., West Haven, CT.

Professor **H. Kurt Jacobs**, formerly with Hines Veterans Affairs Hospital, Hines, IL, has accepted a post in the Department of Surgery, Loyola University Medical Center, Maywood, IL.

John C. Baldwin has moved from the Department of Cardiothoracic Surgery, Yale University School of Medicine, New Haven, CT, to the Department of Surgery, Baylor College of Medicine, Houston, TX.

Accepting a position with the Department of Pharmacology, University of North Texas Health Science Center, Fort Worth, **Glenn H. Dillon** has moved from The Upjohn Company, Kalamazoo, MI.

**Stephanie C. Y. Tjen-A-Looi** has relocated to the Department of Cardiovascular Medicine, University of California, Davis. Prior to this position, she was with the University of Wisconsin School of Veterinary Medicine, Madison.

# **APS Business Meeting**

Tuesday, April 11, 5:15 pm Convention Center Rm. 264/265

# Introducing Jeffrey E. Pessin



Jeffrey E. Pessin, Professor and Associate Director of the Diabetes and Endocrine Research Center at The University of Iowa, became the editor of the American Journal of Physiology: Endocrinology and Metabolism on October 1, 1994, Pessin was born in New

York City and in 1975 received his BA/MA degree in Chemistry from Brooklyn College, Brooklyn, NY. He then entered the graduate program in Biochemistry at The University of Illinois, Urbana, and completed is PhD in 1980. Following a three-year postdoctoral fellowship with Michael P. Czech at The University of Massachusetts Medical Center, Worcester, Pessin was appointed as an Assistant Professor of Physiology and Biophysics at The University of Iowa, Iowa City. In 1988 he was promoted to Associate Professor and in 1991 to Professor and Associate Director of the Diabetes and Endocrinology Research Center at The University of Iowa. Pessin has served as an editor for Endocrinology and is currently on the editorial boards for Endocrinology and Archives of Biochemistry and Biophysics. He has also served on various national committees and has been active in the grant peer-review process for the NIH, American Diabetes Association, and Juvenile Diabetes Foundation International.

Pessin has made numerous contributions to our understanding of the molecular basis of insulin action. His initial efforts were focused on developing detailed understanding of the mechanism by which extracellular insulin binding can activate the intracellular tyrosine kinase domain of the insulin receptor. More recently, his studies have encompassed the identification of intracellular effector proteins that are activated by insulin and their ultimate regulation of glucose transporter gene transcription. Since the insulin receptor is functionally related to other tyrosine kinase receptors, these findings also have important implications for understanding the metabolic and mitogenic properties of other growth factor receptors. These research efforts have been continuously funded since 1983 with research grants from the NIH, American Diabetes Association, Juvenile Diabetes Foundation International, and the US Army Medical Research Acquisition Activity.

Pessin plans to continue the high-quality peer-review process that has been established by his predecessor, Claude Desjardins. He will continue to publish invited review articles concerning particular novel and important findings in the area of endocrinology and metabolism. With his new team of associate editors (Robert Bar, Alan Cherrington, Deborah Segaloff, and Curt Sigmund) he intends to further develop the journal as a leading publication source in biomedical research. He feels that in the current research environment the expeditious dissemination of information is essential for successful advances in the biological sciences. To accomplish this goal, the editorial review process will be centralized to a single office at The University of Iowa, which will make use of electronic mail and facsimile transmissions to speed up the review process. Pessin plans to substantially expand the editorial board and hopes to reduce the review process time down to an average of 30 days from submission to decision. It is anticipated that these changes will help to attract the best manuscripts from research scientist in the biomedical community and establish the American Journal of Physiology: Endocrinology and Metabolism as the premier journal in this field.

# Knobil Elected to Italian National Academy

**Ernst Knobil**, the H. Wayne Hightower Professor in the Medical Sciences and Ashbel Smith Professor at the University of Texas Houston Health Science Center, has been elected a foreign member of the 391-year-old Italian National Academy, Biological Sciences Section. This Section has 28 national members and 27 foreign associates, of whom eight are Americans. Knobil, a member of AAAS and the NAS, is also a foreign associate of the French and Hungarian Academies of Sciences. He is a past president of the APS.

# deBold Shares 1994 Ciba Award

Adolfo J. deBold was one of two recipients of the 1994 Ciba Award for Hypertension Research. deBold was the first to demonstrate that the heart has an endocrine function in addition to its role in the circulatory system. He discovered and isolated the hormone atrial natriuretic factor (ANF), which has powerful diuretic and hypotensive properties. ANF counteracts the renin-angiotensin-aldosterone system, and it is currently being tested in clinical trials for the treatment of acute kidney failure. deBold's original paper describing ANF (*Life Sci.* 28: 89-94, 1981) has been explicitly referenced in more than 1,800 subsequent articles.

deBold is a professor of pathology and physiology at the University of Ottawa and the director of research at the University of Ottawa Heart Institute in Ontario, Canada. He received his undergraduate degree in clinical biochemistry from the National University of Cordoba, Argentina, in 1968 and received his MSc and PhD degrees in pathology from Queens University, Kingston, Ontario, Canada. He held various appointments at Kingston from 1972 to 1985, when he moved to the University of Ottawa. Since 1989 he has also been a Distinguished Research Professor at the Heart and Stroke Foundation of Ontario.

deBold shares the Ciba award with Ervin G. Erdös of the University of Illinois College of Medicine, Chicago. Erdös was recognized for his role in defining the critical enzymes involved in the metabolism of peptides that regulate blood pressure.

# APS Members Elected to Institute of Medicine

Fifty new members have been elected to the Institute of Medicine (IOM), raising the total active membership to 493. In addition, five were honored by direct election to senior membership, bringing that roll to a total of 536. A category of membership established six years ago, foreign associates, now totals 38 with the election of five this year.

Election to the Institute is both an honor and obligation to work on behalf of the organization, its governance, and its studies. With their election, members make a commitment to devote a significant amount of volunteer time on committees engaged in a broad range of IOM studies on health policy issues.

APS members elected to the Institute include:

Shu Chien, M.D., Ph.D., professor and chair, Department of Bioengineering, University of California, San Diego

**David E. Longnecker, M.D.**, Robert D. Dripps Professor and chair, Department of Anesthesia, University of Pennsylvania Medical Center

Irwin H. Rosenberg, M.D., Jean Mayer Professor of Nutrition and Medicine and director, USDA Human Nutrition Research Center on Aging, Tufts University, Boston

Jerome F. Strauss III, M.D., Ph.D., Luigi Mastroianni Jr. Professor; director, Center for Research on Women's Health and Reproduction; and associate chair, Department of Obstetrics and Gynecology, University of Pennsylvania School of Medicine

**Richard W. Tsien,** Ph.D., George D. Smith Professor, Department of Molecular and Cellular Physiology, Stanford University School of Medicine, Stanford, CA

Tadataka Yamada, M.D., John G. Searle Professor and chair, Department of Internal Medicine, University of Michigan

## **APS Membership**

Membership applications may be obtained from APS Membership Services, 9650 Rockville Pike, Bethesda, MD 20814-3991. Applications are reviewed and approved by Council on a regular basis throughout the year.

### **BOOKS RECEIVED**

Arterial Chemoreceptors: Cell to System, Volume 360. Ronan G. O'Regan, Philip Nolan, Daniel S. McQueen, and David J. Paterson (Editors). New York, NY, Plenum Publishing Corporation, 1994, 400 pp., illus., index, \$95.00. ISBN: 0-306-44824-6.

*Fractal Physiology.* James B. Bassingthwaighte, Larry S. Liebovitch, and Bruce J. West. New York, NY: Oxford University Press, 1994, 364 pp., illus., index, \$55.00. ISBN: 0-19-508013-0.

Immunocytochemical Methods and Protocols. Lorette C. Javois (Editor). Methods in Molecular Biology, Volume 34. John M. Walker (Series Editor). Totowa, NJ: Humana Press, 1994, 435 pp., illus., index, \$64.50. ISBN: 0-89603-285-X.

Molecular Biology of Diabetes, Parts I and II. Boris Draznin and Derek LeRoith (Editors). Totowa, NJ: Humana Press, 1994, 555 pp., illus., index, \$99.50. ISBN: 0-89603-287-6.

*Neurocardiology*. J. Andrew Armour and Jeffrey L. Ardell (Editors). New York, NY: Oxford University Press, 1994, 443 pp., illus., index, \$65.00. ISBN: 0-19-507304-5.

Renal Physiology. (Fifth Edition). Arthur J. Vander. New York, NY: McGraw-Hill Health Professions, 1994, 238 pp., illus., index, \$27.00. ISBN: 0-07-067009-9. Resource Physiology of Conifers: Acquisition, Allocation, and Utilization. William K. Smith and Thomas M. Hinckley. San Diego, CA: Academic Press, 1994, 397 pp., illus., index, \$74.95. ISBN: 0-12-652870-5.

Surgical Infections. Donald E. Fry (Editor). Boston, MA: Little, Brown and Company Medical, 1994, 787 pp., illus., index, \$89.95. ISBN: 0-316-29426-8.

Three-Dimensional Analysis of Human Movement. Paul Allard, Ian A. F. Stokes, and Jean-Pierre Blanchi (Editors). Champaign, IL: Human Kinetics, 1995, 372 pp., illus., index, \$45.00. ISBN: 0-87322-623-2.

### **Protein Kinase C**

J. F. Kuo (Editor)

New York, NY: Oxford University Press, 1994, 326 pp., illus., index, \$75.00. ISBN: 0-19-508101-3

In 1979, Y. Nishizuka and colleagues first characterized protein kinase C (pkC). Since then, there has been an exponential growth in literature references connecting it to a wide variety of different signalling pathways in many contexts. Extracellular hormones, growth factors, neurotransmitters, and antigens bind to their respective receptors and through coupling to G proteins and activation of phospholipase generate metabolites that activate pkC directly or indirectly. This signalling pathway may interact with other pathways as well as catalyze series of phosphorylation cascades. This book does a masterful job of tying various themes together and comprehensively covering and citing literature so that the reader can pursue the relationship of pkC to whatever signal transduction pathway(s) is of interest.

Chapter 1 by P. J. Parker is a historical review of the major discoveries in this field. It puts pkC in the context of the superfamily and describes how the members of these families interrelate. It clearly explains what is known and delineates issues that need to be resolved in the future. It explains the complexity of determining what factors are critical in determining the effects of pkC activation such as timing, context, and cell type. This chapter is invaluable for readers new to the field. In Chapter 2, C. W. Mahoney and K.-P. Huang describe in detail the molecular and catalytic properties of pkC. It describes the isoforms found in various tissues and the cellular and subcellular distribution of the many isozymes, giving clues to which pkC's have specialized functions. Also described are the many physical configurations of the enzymes that depend on Ca<sup>2+</sup>/Mg<sup>2+</sup> balance and the activating molecules (PIP<sub>2</sub>, DAG, etc.), giving the reader an appreciation of the complexities that are understood to some degree to date. The interspecies variations in pkC members are also described. A. F. G. Quest and R. M. Bell explain the molecular relationships between lipids interacting with pkC and their effects on its activity. Also described are how phosphatidylinositol turnover and diacylglycerol turnover were discovered to play key roles in signal transduction rather that just being products of turnover of membrane constituents. There is a chapter by C. A. O'Brian and J. F. Kuo on pkC inhibitors and one by J. D. Lambeth on how receptor-regulated phospholipases generate lipid mediators, which activate pkC. There is a separate chapter by R. I. Glazer dealing with what is known about the role of pkC in multidrug resistance, neoplastic transformation, and differentiation. Different isoforms of pkC are thought to be involved in these phenomena in different ways. Studies in diverse cell types are reviewed. In addition, this chapter discusses what is known about pkC and its downstream activation by-product, Nf B, which can function as transcriptional regulators. There are also chapters dealing with the nervous system (P. J. Conn and J. D. Sweatt), the heart (M. Púceat and J. H. Brown), and smooth muscle (M. Nishikawa and H. Hidaka). In these tissues, specialized isoforms of pkC interact with organ-specific substrates. Recent advances are catalogued and summarized. All are well referenced to lead the reader to pertinent papers in the areas of particular interest. There is a thoughtful and suitably cautious article by M. J. McCabe and S. Orrenius about the role of pkC in apoptosis, a newly burdgeoning yet already controversial field (1, 2). I appreciated this chapter for its clarity in defining terms and for its efforts to describe the literature objectively. The book also contains a chapter by R. E. Honkanen and A. L. Boynton about serine/threonine protein phosphates and their inhibitors, which regulate the breakdown of pkC and therefore also contribute to regulation of its steady state.

In summary, I think this book is a valuable resource. It is a vast compilation of research. I would have liked to have seen more critical statements from some authors, however, that could help the reader make discriminating judgements about the literature. These would include opinions about the validity of some of the findings, comments about differences between various experimental models, and how to compare findings in one system vs. others or in one cell type vs. another. Also, I would have liked to read more of what the authors think are likely to be indirect effects vs. pivotal functions of pkC.

> Miriam L. Wahl Thomas Jefferson University

1. Farber, E. Programmed cell death: necrosis versus apoptosis. Mod. Pathol. 7: 605-609, 1993.

2. Schulze-Osthoff, K., H. Walczak, W. Dröge, and P.H. Krammer. Cell nucleus and DNA fragmentation are not required for apoptosis. *J. Cell Biol.* 127: 15-20, 1994.

# Gut Peptides: Biochemistry and Physiology

(Comprehensive Endocrinology, Revised Series) John H. Walsh and Graham J. Dockray (Editors) New York, NY: Raven Press, 1994, 896 pp., illus., index, \$150.00. ISBN: 0-7817-0115-5

The editors state in the preface that "this book provides a comprehensive approach to gastrointestinal hormones...[and] will be of interest to clinicians and scientists who are interested in hormonal regulation of the gastrointestinal tract." I agree with the editors' overall assessment of the book but found, as with most multiauthored books, an unevenness to the chapters that alternately made its reading fascinating or frustrating. The book is organized into three sections: General Principles, which includes three chapters; The Peptides, which contains 19 chapters on individual gut peptides; and Physiology and Pathophysiology, which has 11 chapters on peptide regulation of gastrointestinal physiology and pathophysiology. The book suffers from the lack of a precise definition of "gut peptide" and, subsequently, best succeeds when it focuses on the peptide products of gastroenteropancreatic endocrine cells and neurons.

Chapter one provides a good general introduction to regulatory peptides but fails to explain why endothelin, predominantly a product of endothelial cells, and growth factors, such as EGF, IGF, and TGF, which are present in a wide variety of cell types, are considered major gut peptides while other growth factors, such as FGF and PDGF, and lymphokines, such as IL-1 and IL-6, are not. A broad definition of gut regulatory peptides that includes the products of nonneuroedocrine cell populations realistically reflects the complexity of gastrointestinal regulation but distracts from the book's focus on neuroendocrine peptides. The second chapter on molecular approaches to the study of gut peptides is particularly well written and provides the reader with an excellent overview of how molecular biological techniques are being used to study gut peptides. A discussion of the potential of gene ablation techniques to further our understanding of regulatory peptide action would have been a useful addition to this chapter. The third chapter is on signal transduction, and although the general discussion of signal transduction mechanisms is interesting, it is tangential to the book's focus on gut peptides and their receptors.

The meat of the book is in the second section. Each chapter in this section represents a minireview of a specific gut peptide or peptide family. The chapters typically include a historical account of the peptide's discovery and descriptions of the molecular biology and biochemistry of the particular peptide. Additional information about peptide distribution, receptors, and physiological action is discussed. Extensive references are provided at the end of each chapter. Particularly well written are the chapters on gastrin and secretin. The important contributions that scientists studying gut peptides have made to the fields of physiology, endocrinology, and neuroscience are obvious from these chapters. The chapters on endothelin, EGF, insulin-like growth factors, and transforming growth factor- $\beta$  are less cohesive than the chapters on neuroendocrine peptides, and fewer "take-home" messages can be gathered from their reading.

The final 11 chapters attempt to integrate the effects of individual gut peptides on specific physiological and pathophysiological states. These chapters give the reader a sense of the multifactorial regulation of normal gastrointestinal function and the important role that gut peptides play in this process. Some of these chapters are redundant with earlier chapters, which is unavoidable, but as individual entities they largely succeed in providing current overviews of their respective topics.

Overall, this book includes many well written chapters and is a valuable contribution to the literature. The book will be of particular interest to endocrine physiologists and, more broadly, to endocrinologists and clinical gastroenterologists attempting to stay current with the recent advances in gastrointestinal regulatory peptide biology.

> K. A. Roth Washington University

# Pulmonary Care of the Surgical Patient

Leland H. Hanowell and Forrest Junod (Editors) Mount Kisco, NY: Futura Publishing Company, 1994, 400 pp., illus., index, \$ 65.00. ISBN: 0-87993-568-5

This book is a multiauthor book consisting of 11 chapters. The first four chapters cover the perioperative care of patients with obstructive airway disease and trauma. Chapter 5 focuses on diagnosis, pathophysiology, and treatment of the adult respiratory distress syndrome. Chapters 6 and 7 cover procedural techniques involving mechanical ventilation and bronchoscopy, respectively. The next two chapters pertain to infection issues, including management of pleural space infection and antibiotic therapies and prophylaxis. The last two chapters concern postoperative problems of pain management and pulmonary embolism, respectively. Unfortunately, other valuable related topics are lacking. A chapter on the pulmonary care of the cardiac surgical patient and that devoted to the perioperative care of patient receiving a lung transplant are not included. Nevertheless, the heart resides within the thoracic compartment, whereas in the age of lung transplant the latter is only logical.

Given the delay between the submission of manuscript and publication, in general the information provided in this book is up to date (up to 1992). The chapters on pulmonary embolism and pain management provide an excellent review. However, there are several problems encountered in this book. The target readers were not defined. Some of the chapters did not provide a clear outline. Because of this, within a chapter there is a lack of cohesiveness among the topics discussed, and in chapter 3, a repetition of a subheading. In the chapter on asthma, too much emphasis was given to the pulmonary function testing in general and very little on the specific use in predicting perioperative risks. The preoperative evaluation of patients with chronic obstructive lung disease, particularly for lung resection, neglected the utility of exercise testing. As presented, the chapters on adult respiratory distress syndrome and mechanical ventilation do not belong in this book. Excellent reviews on both topics have been published elsewhere. Attention could be given to the perioperative care of patients with Adult Respiratory Distress Syndrome requiring a surgical procedure and the management of mechanically ventilated surgical patients. Minor issues are a few typographical errors and a lack of axis labels in some of the figures.

My overall impression is that this book will best serve as a review and not as a reference. It is suitable for clinicians taking care of the surgical patients in general and in the specialty of pulmonary and critical care medicine in particular.

> Catherine S. H. Sassoon Veterans Affairs Medical Center, Long Beach, CA

## **Neurophysiology of Ingestion**

David A. Booth (Editor) Pergamon Studies in Neuroscience No. 6 William Winlow (Series Editor) Oxford, UK: Pergamon Press, 1993, 178 pp., illus., index, \$96.00. ISBN: 0-08-041988-7

John Brobeck, one of the founders of the modern study of ingestion, once remarked that ignorance about visceral afferent nerves was a major obstacle to progress in understanding the physiology of the control of food intake. This was 30 years ago. Recent research has confirmed Brobeck's prescience. It is now clear that visceral afferents and oral afferents are major mechanisms for the control of meal size. Thus, this book is particularly welcome because it "is the first to focus on bringing together the major contributions of integrative cellular neurophysiology to the understanding of the neural bases of mammalian eating and drinking behavior."

The editorial charge to the authors of the nine chapters was to review and constructively criticize their own and others' research on a particular aspect of ingestive neuroscience in a way that was accessible to biological or behavioral scientists in other areas. Judged by these criteria, the nine chapters succeed.

In the first chapter, Booth sets the tone of the book by reviewing the various problems that ingestive behavior sets for neurophysiological analysis. These include innate and acquired preferences and aversions; the effects of lesions, such as those that produce ventromedial hypothalamic obesity; the effect of local injections of transmitters and neuromodulators; satiation; and the dynamics of meal size. However, Booth argues for the necessary centrality of integrative neurophysiology to the solution of these problems because neurophysiological research is the only way to work out how nerve cells interact with each other and with the environment in network systems that perform the functions of the brain. That is not a new view, but it has rarely been urged so clearly in the context of ingestive behavior, a field only recently emerging from the hegemony of metabolic and nutritional ideas of a rather coarse character.

The next four chapters deal with afferent nerves from postingestive organs, such as the stomach (Blackshaw and Grundy), small intestine (Meï), and liver (Ewart and Novin). These are excellent and critical reviews of a scattered literature. An important theme, developed most explicitly by Meï, is the difficulty of determining the functions of visceral afferents. A visceral afferent fiber sensitive to specific chemical or mechanical stimuli having been isolated, it remains to be demonstrated whether this visceral afferent information is processed for the control of ingestion, for the control of visceral functions, or for both.

The focus of the next three chapters is the mouth and the stream of sensory information that originates there during ingestion. It is a happy surprise to see the oral sense of touch (Mormoto and Tokada) included with the traditional chemosensory systems of taste (Scott and Giza) and smell (Gervais).

The book ends with a review by Rolls of the neural control of feeding in primates. This is a splendid synthesis of current information about the possible functions of hypothalamic, orbitofrontal, and striatal units in the control of eating.

This book is filled with useful information presented clearly and critically. It is well produced, particularly the numerous diagrams and figures. The index works and the references are accurate. Many investigators will want to own this book. Because it is written in such an accessible way, the book should be useful for teachers of undergraduate and graduate students. And, of course, university and scientific libraries should acquire it.

> Gerard P. Smith Cornell University Medical College

## Current Management of Cerebral Aneurysms

Issam A. Awad (Editor)

Park Ridge, IL: AANS, 1993, 330 pp., illus., index, \$90.00. ISBN: 1-879284-13-8

Subarachnoid hemorrhage (SAH) as a consequence of intracranial aneurysm rupture affects approximately 28,000 individuals in North America each year. Of these, about 18,000 individuals die or become disabled, while no more than 33% of the total achieve a functional outcome despite the best medical care. As such, cerebral aneurysms continue to be one of the most difficult pathologies encountered by neurosurgeons, neurologists, and intensive care specialists. In addition, the medical consequences that are imminent once a patient sustains an aneurysmal SAH are myriad. Hence, texts such as *Current Management of Cerebral Aneurysms* are essential given the complexity and dynamism of this disease and the evolving effort to understand it.

This text, published in 1993, is one of the continuing neurosurgical topic series produced by the American Association of Neurological Surgeons Publication Committee. It draws from among the foremost authorities in the field of aneurysmal SAH who write about their expertise in one of the 14 contributed chapters. In addition to practicing neurosurgeons, contributors include full-time researchers, anesthesiologists, radiologists, and those who share both research and clinical duties in their profession. The manuscript, as the title suggests, focuses on the clinical management and characteristics of cerebral aneurysms and SAH with interspersed details of related basic science.

The first three chapters of the text examine the preoperative characteristics of aneurysms. Included here are the epidemiology, genetics, clinical presentation, and radiological imaging of both ruptured and unruptured aneurysms. Discussions range from clinical observations of risk factors for aneurysm rupture to histological studies of the irregular distribution of Type III collagen reticular fibers in intracranial arterial tissue surrounding aneurysms to the physics of magnetic resonance imaging of blood flow in the aneurysmal sac. The second three chapters focus on the perioperative management of these lesions and include anesthetic considerations as well as the major issues regarding the timing of surgery to treat these lesions definitively. Because of the date of the publication and the evolving nature of medicine, some of the basic preoperative and anesthetic treatment essentials may already be outdated as stated, but comprehensive protocols are nonetheless included. The section regarding surgical timing is truly a five-page elementary summary of one of the most controversial topics of aneurysm treatment. Nonetheless, it addresses the basic issues confronting neurosurgeons in making this decision. Chapters seven through nine deal with the surgical management of aneurysms with respect to their size and location. The chapters are quite variable in quality, partially because of the enormous number of surgical issues that they address. Each is written by authorities in aneurysm surgery, and each has its strengths and weaknesses. There is no attempt here to discuss results based on rigorous clinical trials. Bonuses of these sections include excellent anatomic discussions and evaluations of cerebral protection techniques during aneurysm clipping. However, this degree of detail may complicate understanding for the nonsurgeon.

Three of the next four chapters examine special topics related to intracranial aneurysm, and the fourth presents a fairly thorough discussion on cerebral vasospasm following SAH. Included in the former group is an evaluation of endovascular treatment of this disease as described by a neurosurgeon who practices this art. The chapter is an honest and realistic appraisal of the topic and suggests that open surgical management, at this time, continues to be the definitive treatment. Other sections include the physiology of damage to endothelium caused by sickle-cell anemia and its effect on aneurysm patients. The final chapter is a frank discussion of the results and complications of aneurysm surgery and perioperative management in the hands of one of the most respected surgeons in the field. This section is a refreshing evaluation of his neurosurgical results without interference from a conflicting ego.

Overall, this textbook is an excellent introduction and update in the current management of aneurysmal SAH. The manuscript is extremely well referenced and thus will help those who desire to pursue in-depth assessments of various topics. Because of the nature of the topic itself, however, the breadth of detail presented ranges from elementary in the first few chapters to in-depth discussions regarding endovascular surgery and the considerations of different surgical approaches to intracranial aneurysms.

> Adam P. Brown and Robert F. Spetzler Barrow Neurological Institute, Phoenix, AZ

**Research associate (postdoctoral fellow)**. The Division of Pediatric Pulmonary Medicine of St. Louis University is recruiting an individual interested in the study of airway mucus secretion and clearance to join a research group of five investigators. The candidate should have a PhD in respiratory physiology or pharmacology and strong interpersonal and writing skills. This is a one year, renewable non-tenure track faculty appointment. Applicants should submit curriculum vitae and the names of three references to Dr. Bruce K. Rubin, Director, Division of Pulmonary Medicine, Cardinal Glennon Children's Hospital, 1465 S. Grand Blvd., St. Louis, MO 63104-1095. M/F/D/V. EEO Employer.

**Postdoctoral fellow/research associate**. Applications are invited for postdoctoral/research associate positions to study the regulation of extracellular matrix in the kidneys, heart, and blood vessels in hypertension and type II diabetes. Candidates must have a PhD or an MD with an interest in physiological research and training in cellular and/or molecular biology of extracellular matrix regulation. Salary will be commensurate with experience and credentials. Interested applicants should send a curriculum vitae, a statement of research interests, and names of at least three references to Dr. John Hall, Department of Physiology and Biophysics, University of Mississippi Medical Center, Jackson, MS 39216. The University of Mississippi Medical Center is an equal opportunity employer. M/F/D/V.

Physiologist with specialty in immunology, neuroscience, or molecular biology. Anticipated tenure track position at Assistant Professor level to start September 1, 1995. Ability to teach Anatomy and Physiology and advanced/graduate level courses in area of specialization. Experience in transmission electron microscopy is desirable. Expected to establish active research program involving students. PhD required. Postdoctoral teaching and research experience preferred. Please include a statement of teaching and research interests and selected reprints with application. Salary, based upon background and experience, is competitive. As an accredited State College of New Jersey offering 50 undergraduatc and graduate programs, the institution is committed to educational excellence, cultural diversity, and community outreach. Apply to Dr. Miryam Z. Wahrman, Chairperson, Department of Biology, William Paterson College, Wayne, NJ 07470. Review of applications will begin 30 days after publication of the ad. [EOAAE]

Physiologist. New York University's Department of Biology is undergoing a major program of expansion and development. Ten faculty have been added in the past four years. The department is now seeking an outstanding physiologist at the Assistant Professor level (tenure track), although senior appointments may be made to distinguished scientists with established research programs. Candidates are expected to establish an active, externally funded research program and to teach at the undergraduate and graduate levels. The department offers an excellent research environment, substantial start-up packages, and modern laboratory facilities. Application letters with curriculum vitae and three letters of reference should be sent to: Chairman of the Search Committee. Biology Department, New York University, 1009 Main Building, 100 Washington Square East, New York, NY 10003. New York University encourages applications from women and members of minority groups.

### **Positions Available**

There is a \$50 charge for each position listed. Positions will be listed in the next available issue of *The Physiologist* and immediately upon receipt on the APS Gopher Information Server. Listings will remain on the APS Information Server for three months.

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

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## **APStracts**

an on-line publication of the abstracts of manuscripts accepted for publication in all APS journals as of January 1995.

# **Scientific Meetings and Congresses**

Sepsis/SIRS: Reducing Mortality to Patients and Suppliers, February 20-21, 1995, Washington, DC. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

**Treatment of Reperfusion Injury**, February 20-21, 1995, New Orleans, LA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

**Prevention of Restenosis**, February 21-22, 1995, New Orleans, LA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

Medical Imaging 1995, February 26-March 2, 1995, San Diego Marriott Hotel & Marina, San Diego, CA. *Information:* in the US, contact International Society for Optical Engineering, PO Box 10, Bellingham, WA 98227-0010. Tel: 206-676-3290; fax: 206-647-1445; e-mail: spie@spie.org. In Europe, contact International Society for Optical Engineering, c/o HIB-INFONET, PO Box 4463, N-5028 Bergen, Norway. Tel: 47-55-54-37-84; fax: 47-55-96-21-75; e-mail: spie@hib-inc.no.

Sixth Annual Spring Brain Conference, March 1-5, 1995, Poco Diablo Resort, Sedona, AZ. *Information*: James E. Smith, Dept. of Physiology and Pharmacology, The Bowman Gray School of Medicine, Medical Center Blvd., Winston-Salem, NC 27157-1083. Tel: 910-716-8506; fax: 910-716-8501; e-mail: jamsmith@isnet.is.wfu.edu.

Sigma Xi Forum 1995, March 2-3, 1995, Sheraton Imperial Hotel, Research Triangle Park, NC. *Information*: Dee Windley, Sigma Xi, PO Box 13975, Research Triangle Park, NC 27709. Tel: 1-800-243-6534 or 919-549-4691; fax: 919-549-0090; e-mail: forum95@sigmaxi.org.

Second Annual The Human Genome Project: Commercial Implications, March 6-8, 1995, San Francisco, CA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

Advances in Genetic Screening and Diagnosis of Human Diseases, March 9-10, 1995, San Francisco, CA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

Cytokine Therapy: Advances in Clinical Application and Commercialization, March 9-10, 1995, Sheraton City Centre Hotel, Washington, DC. *Information*: IBC USA Conferences Inc., 225 Turnpike Rd., Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.

Third Annual Vaccines: New Technologies and Applications, March 20-22, 1995, Alexandria, VA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937. **HIV Clinical Trials**, March 30-31, 1995, Washington, DC. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

New Cancer Strategies: Angiogenesis Antagonists, April 3-4, 1995, Washington, DC. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

**Development of Small Molecule Mimetic Drugs**, April 10-11, 1995, San Francisco, CA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

**Computer-Aided Drug Development**, April 12-13, 1995, San Francisco, CA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

Infectious Disease Diagnosis, April 19-20, 1995, Washington, DC. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

**Preclinical Trials**, April 24-25, 1995, Tysons Corner, VA. *Information*: Cambridge Healthtech Institute, 1000 Winter St., Suite 3700, Waltham, MA 02154. Tel: 617-487-7989; fax: 617-487-7937.

Human Anatomy and Physiology Society, May 20-25, 1995, Hyatt Regency at Union Station, St. Louis, MO. *Information:* Kevin Patton, SCCCC Life Science, 4601 Mid Rivers Mall Dr., PO Box 76975, St. Peters, MO 63376-0975. Tel: 314-922-8000 ext. 4338; fax: 314-922-8352; e-mail: kpatton@chuck.stchas.edu.

Fourth IBRO World Congress of Neuroscience, July 9-14, 1995, Kyoto, Japan. *Information*: Congress Secretariat, Fourth International Congress of Neuroscience, c/o International Communications Specialists, Inc., Kasho Bldg., 2-14-9, Nihombashi, Chuo-ku, Tokyo 103, Japan. Tel: 81-3-3272-7981; fax: 81-3-3273-2445.

American Institute of Biological Sciences 46th Annual Meeting, August 6-10, 1995, Town and Country Hotel, San Diego, CA. *Information*: AIBS Meetings Department, 730 11th St., NW, Washington, DC 20001-4521. Tel: 1-800-992-2427 or 202-628-1500; fax: 202-628-1509.

Society of General Physiologists' 49th Annual Symposium: Organellar Ion Channels and Transporters, September 6-10, 1995, Woods Hole, MA. *Information*: David Clapham, Department of Pharmacology, Mayo Clinic and Foundation, Rochester, MN 55905. Tel: 507-284-5881; fax: 507-284-9111.

Inflammation '95: World Congress on Inflammation, September 17-22, 1995, Brighton, UK. *Information:* Kay Dorelli, Inflammation '95, Triangle House, Broomhill Rd., London SW18 4HX, UK. Tel: 81-877-9920; fax: 81-877-9308. Biomedical Engineering Society 1995 Annual Fall Meeting, October 6-9, 1995, Boston University, Boston, MA. *Information*: Kate Straus, BMES Fall Meeting 1995, 45 Avon Rd., Wellesley, MA 02181. Tel/fax: 617-237-2277; e-mail: bmes95@aol.com.

Transcriptional Activation in Response to Cytokines and Growth Factors, October 6-9, 1995, Keystone, CO. *Information*: Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; e-mail: asbmb@asbmb.faseb.org.

The Role of Lipid Messengers in Signal Transduction Pathways, Cellular Regulation, and Disease, October 20-23, 1995, Keystone, CO. *Information*: Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; e-mail: asbmb@asbmb.faseb.org.

**Receptor Engineering**, October 27-30, 1995, Granlibakken, Lake Tahoe, CA. *Information*: Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; e-mail: asbmb@asbmb.faseb.org.

# FISICOMP-L on LISTSERV@IF.USP.BR

FISICOMP-L is a discussion list established by members of the Comparative Physiology Section of the Brazilian Physiological Society. Its primary aim is to serve as an open forum for discussion of relevant problems in this field as well as a channel for information exchange between students and/or researchers interested in the study of physiological mechanisms of either terrestrial or aquatic animals.

To subscribe, send the following command in the body of mail to LISTSERV@IF.USP.BR on the Internet: "SUB-SCRIBE FISICOMP-L". You will then be added to the list and will receive a welcome message explaining the basic commands.

For assistance, contact Euclydes A. Santos Filho at <dcfeucly@cpd.furg.br>.

# **FASEB** Career Resources

The Office of Placement Services has been reorganized and renamed FASEB Career Resources under the direction of the Director of Human Resources. The objective of the reorganization was to develop new or expanded activities that would provide a needed service to and be in demand by the biomedical community, meet the competitive challenge and technological opportunities of the 21st century, and be financially viable.

Initially the major activities of the FASEB Career Resources office are as follows.

- The initiation and maintenance of an electronic data bank, **Careers OnLine**, accessible through the Internet. Careers OnLine is designed to provide a global match of applicants at all stages of their professional careers with available positions in academe, government, and industry. Careers OnLine, because of its international reach, is intended to be the core of an employer's job search and efforts to satisfy obligations to recruit a diversified work force under equal employment guidelines.
- The management and operation of **FASEB Job Fairs** at scientific meetings that will provide computerized searches of applicants registered for the job fair as well as computerized scheduling of face-to-face interviews, a confidential communication system for employers and applicants to make independent interview arrangements if desired, and a highly visible position vacancy posting area. Access to Careers OnLine will also be available at these job fairs.
- An **Outplacement Service** for organizations and institutions that are downsizing, reengineering, or restructuring due to buy-outs, technological advances, etc. This service provides other prospective employers with access to resumes and employees being laid off or otherwise terminated.
- **Careers Hard Copy,** which is a new special monthly bulletin for employment opportunities and positions desired devoted solely to the life sciences and biomedical professions. This publication will initially reach over 36,000 scientists worldwide.

The FASEB Career Resources Office activities will eventually include full career development programs such as resume preparation, interviewing, targeting the job market and job/career transitioning through publications, seminars, conferences, etc. The FASEB Career Resources Office will also conduct salary surveys of biomedical scientists in academe, government, and industry.

*Information*: Career Resources Office: Tel: 301-530-7020; fax: 301-571-0699; e-mail: careers@faseb.org. Classified Advertising: Tel: 301-530-7159; fax: 301-571-0683; e-mail: adnet@faseb.org.