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Association of Chairs of Departments of Physiology

2002 Survey Results

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The Association of Chairs of Departments of Physiology annual survey was mailed to 176 physiology departments throughout the US, Canada and Puerto Rico. A total of 80 surveys were returned, for a response rate of 45%. This rate is lower than that of the 2001 survey (55%). Of the 79 surveys returned, there were 37 public and 25 private medical schools, in addition to 17 non-medical (which are public veterinarian or osteopathic schools).

The data provide the reader with general trends of faculty, salary, overall departmental budgets, and space available for research. Faculty salary information (Tables 1-3) is derived from the total compensation column, which includes any supplementary income but not fringe benefits. In addition to salary information, further data are provided on tenure, gender, ethnicity, and salary by number of years in rank.

The statistics are based on 80 responses (4 from Canada) but the results of salary, tenure, gender, ethnicity, and number of years in rank are calculated on the number of respondents providing this information. However, 7 institutions did not provide any faculty salary information. In addition, results presented reflect responses from those institutions reporting, which may vary on a year-to-year basis.

Student/trainee information is provided by ethnicity for predoctoral and postdoctoral categories, as well as predoctoral trainee completions, stipends provided, and type of support.

Departmental budget information (Table 4) shows type of support, faculty salaries derived from grants along with negotiated indirect costs to the departments. Table 5 ranks responding Institutions according to their total dollars, research grant dollars, and departmental space. Space averages are presented as research, administration, teaching and other. ❖

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Table 1. Faculty Salaries for Fiscal Year 2002

		Median	% Change From Previous Survey	Minimum	Maximum	No. of Faculty
Chairperson						
	All Schools	$166,400	-0.08%	$56,450	$280,000	69
	Medical Public	177,477	1.20	66,300	280,000	34
	Medical Private	166,800	-4.11	56,450	247,679	22
	Nonmedical	148,300	11.69	74,828	254,500	13
	Female	139,880	7.24	56,450	247,679	6
Professor						
	All Schools	116,266	3.24	42,114	267,800	549
	Medical Public	118,046	4.67	42,114	267,800	285
	Medical Private	115,500	0.81	50,000	257,700	153
	Nonmedical	114,732	7.55	43,031	198,172	111
	Female	112,937	2.48	57,552	257,700	83
Associate Professor						
	All Schools	81,853	0.94	34,800	180,000	313
	Medical Public	80,977	-0.40	34,800	180,000	148
	Medical Private	79,400	-0.76	47,798	146,462	75
	Nonmedical	87,530	2.60	50,000	134,540	90
	Female	84,443	3.12	50,918	180,000	69
Assistant Professor						
	All Schools	69,111	2.36	32,398	130,603	244
	Medical Public	69,611	3.57	40,800	106,240	120
	Medical Private	66,189	-2.74	37,927	130,603	67
	Nonmedical	70,931	5.83	32,398	107,880	57
	Female	69,400	6.12	37,927	107,880	72
Instructor						
	All Schools	45,000	-4.44	32,000	90,321	49
	Medical Public	44,323	-1.28	32,000	90,321	26
	Medical Private	48,000	0.00	34,000	70,000	18
	Nonmedical	50,000	0.00	42,642	74,400	5
	Female	45,678	2.51	37,872	90,321	22

Table 2. Average Salary by Number of Years in Rank

	Years					
	0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26+**
Chairpersons						
Salary	$160,771	$151,911	$186,327	$188,697	$201,149	$195,526
# of Faculty	26	14	14	8	5	2
Professors						
Salary	114,131	115,064	126,315	127,435	132,787	134,015
# of Faculty	140	112	118	81	42	49
Assoc. Professors						
Salary	84,414	80,248	87,865	79,788	89,376	78,023
# of Faculty	169	64	41	13	15	9
Asst. Professors						
Salary	68,622	69,711	63,193	61,885	60,330	24,576
# of Faculty	198	31	7	2	1	
Instructors						
Salary	46,813	41,709	68,151	0	0	0
#of Faculty	44	3	2		0	0

Space Controlled by Department	
Research	16,756
Administration	3,187
Teaching	2,716
Other	1,949
Total space	22,708

Type of Institution (n = 79)

Support		*Teaching Interactions*			
Public	50	MD/DO	74	Pharmacy	17
Private	29	DDS	24	Other biomedical	53
		DVM	7	Life science	38
		Allied health	39	Bioengineering	26
				Other	20

Student/Trainee Summary

Total number of US citizen/resident alien pre- and postdoctoral students/trainees

Predoctoral male	344	Postdoctoral male	197
Predoctoral female	318	Postdoctoral female	138

Total number of foreign pre- and postdoctoral students/trainees

Predoctoral male	185	Postdoctoral male	395
Predoctoral female	187	Postdoctoral female	215

Tenure status in each department by degree

	Tenured	*Not Tenured*	*Not Eligible*	*Total*
MD	33	1	13	47
PhD	787	37	242	1,066
Both	77	0	27	104
Other	13	0	2	15

Ethnicity of each pre- and postdoctoral student/trainee

	Predoctoral		*Postdoctoral*	
	Male	Female	Male	Female
American Indian/ Alaskan Native	4	3	3	3
Asian/Pacific Islander	37	34	43	21
Black, not Hispanic origin	22	34	8	8
Hispanic	21	21	10	5
White, not of Hispanic origin	260	226	133	101

Faculty Summary (n = 1,290)

	Male	*Female*	*Total*
American Indian/ Alaskan Native	2	1	3
Asian/Pacific Islander	85	37	122
Black, not Hispanic origin	12	3	15
Hispanic	36	15	51
White, not of Hispanic origin	835	197	1,032
Foreign national	55	12	67
Total	1,025	265	1,290

Number of foreign pre- and postdoctoral students/trainees

	Predoctoral		*Postdoctoral*	
	Male	Female	Male	Female
African	5	0	4	1
Asian/Pacific Islander	100	120	231	102
Central and South American	11	5	16	11
European, Canadian, Australian	38	41	96	83
Middle Eastern	25	13	18	9
Other	3	4	17	6

Number of foreign pre- or postdoctoral trainees whose primary source of support is:

	Predoctoral	*Postdoctoral*
Institutional	125	40
Research grants	167	432
Private foundations	7	47
Home (foreign) governments	11	23
Other	7	16

Foreign National predoctoral trainee completions:

	Male	*Female*
African	0	0
Asian or Pacific Islander	22	26
Central or South American	3	0
European, Canadian, Australian	20	10
Middle Eastern	6	6
Other	2	0

Predoctoral Trainee Completions

Number of trainees who have completed doctoral work during the year ended June 30, 2002

Predoctoral male	146	*Predoctoral female*	96

US citizen/resident alien predoctoral trainee completions:

	Male	*Female*
American Indian/Alaskan Native	1	0
Asian or Pacific Islander	10	7
Black, not of Hispanic origin	5	4
Hispanic	3	1
White, not of Hispanic origin	74	42

Average annual starting stipend (in US dollars) for trainees:

Predoctoral	*Postdoctoral*
$18,540	$31,910

Table 3. Salaries by Region

Region	Average	Median	Minimum	Maximum	Total
Chairperson					
Northeast	$189,515	$180,250	$135,259	$254,500	11
Midwest	172,503	152,778	103,544	280,000	13
South	171,318	158,710	89,524	264,000	23
West	165,444	164,354	103,223	223,596	6
Canada/Puerto Rico	61,375	61,375	56,450	66,300	2
Professor					
Northeast	118,166	117,307	25,893	206,640	109
Midwest	126,691	123,657	50,049	244,218	110
South	115,673	107,452	69,547	267,800	153
West	134,840	129,450	11,500	255,000	80
Canada/Puerto Rico	63,089	67,080	56,652	67,080	5
Associate Professor					
Northeast	83,525	80,916	52,000	113,558	41
Midwest	86,128	86,600	50,000	134,540	88
South	79,241	77,353	34,800	180,000	102
West	82,407	79,034	63,973	110,700	18
Canada/Puerto Rico	60,686	53,785	47,798	87,376	4
Assistant Professor					
Northeast	66,366	69,451	21,667	92,700	49
Midwest	74,210	73,817	43,000	130,603	41
South	65,787	66,768	40,800	88,800	96
West	75,716	69,151	45,147	106,240	28
Canada/Puerto Rico	49,548	49,548	49,548	49,548	1
Instructor					
Northeast	49,855	44,723	40,800	90,321	10
Midwest	50,730	49,750	32,000	74,400	10
South	41,962	39,627	34,000	57,325	17
West	46,659	44,892	37,872	57,212	3
Canada/Puerto Rico	0	0	0	0	1

Northeast: ME, NH, VT, NY, MA, RI, CT, NJ, PA, MD, DE, DC

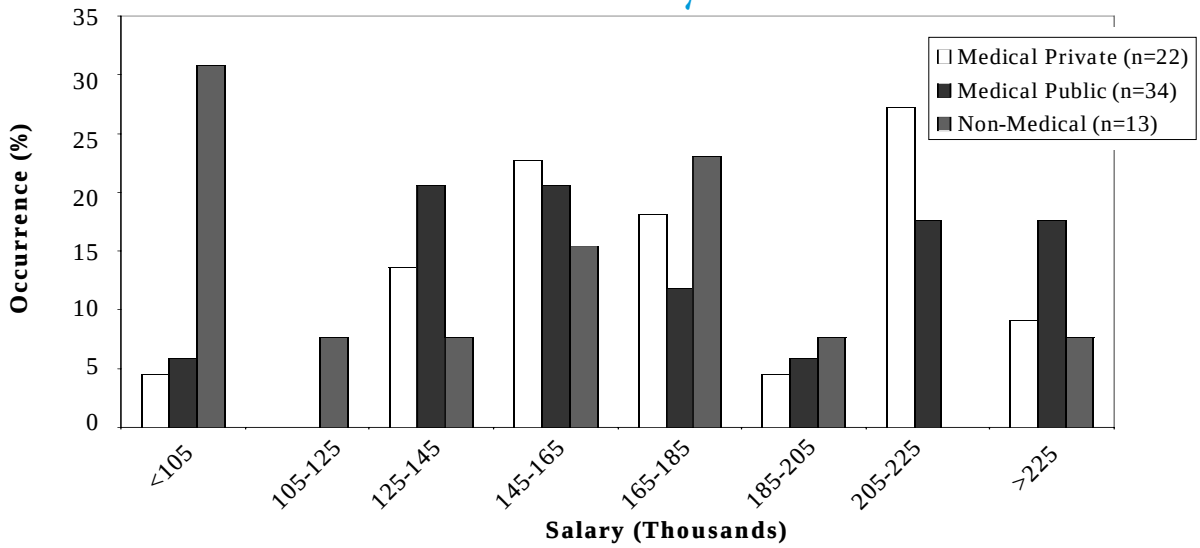
Midwest: MI, OH, IN, IL, WI, IA, MO, KS, NE, ND, SD, MN

South: VA, WV, KY, TN, NC, SC, GA, FL, AL, MS, AR, LA, OK, TX

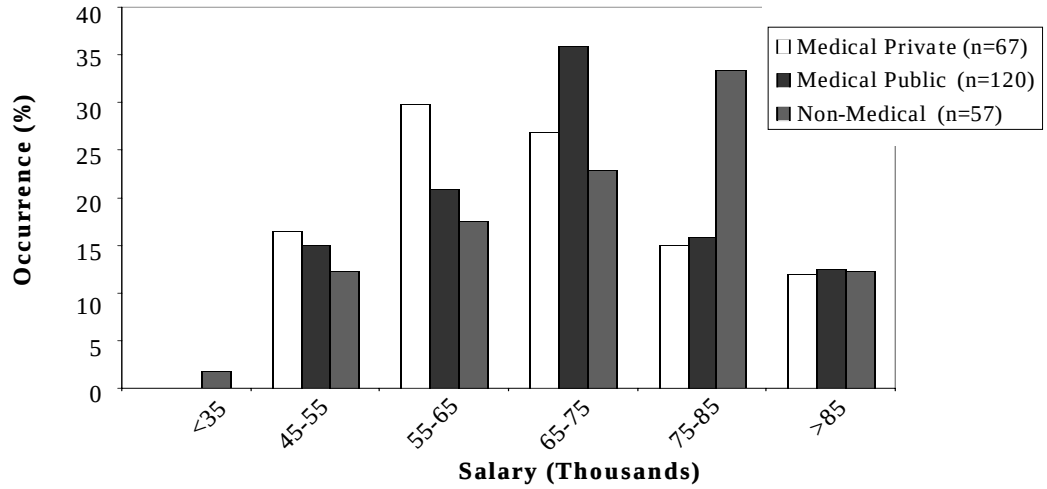
West: AK, HI, MT, WY, CO, NM, AZ, ID, WA, OR, CA, UT

Salary Comparison by Title

Chairs by Institution



Assistant Professors by Institution



Associate Professors by Institution

Professors by Institution

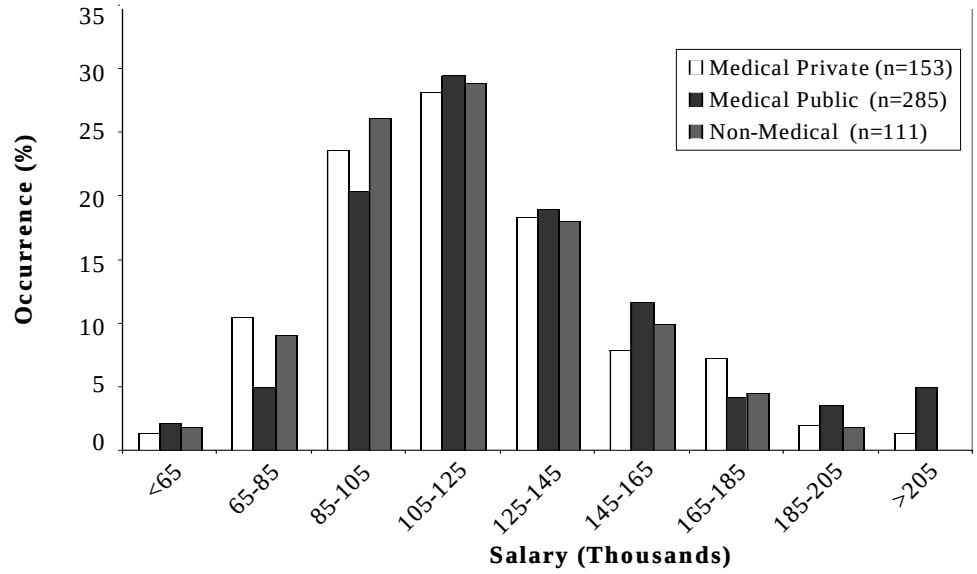


Table 4. Budgets by Institutions

	All Institutions	No.	Private Med.	No.	Public Med.	No.	Nonmed.	No.
Institutional	$1,579,842	78	$1,392,156	25	$1,692,194	37	$1,655,174	16
Outside Research Grants (direct costs)	3,603,417	76	3,355,862	25	3,556,337	37	3,898,052	14
Training Grants (direct costs only)	305,283	38	286,201	14	266,989	18	362,660	6
Endowments	342,041	41	725,499	9	212,730	24	87,895	8
Indirect Cost Recovery (amount to dept.)	232,931	43	297,064	7	205,587	28	196,141	8
Other Budget Support (identify)	310,672	61	584,463	16	245,901	36	101,651	9
Average Departmental Budget	5,790,753		5,626,705		5,911,239		5,401,163	

Financial Information

Current fringe benefit rate most frequently used for Primary faculty	26.72	(*n* = 77)
Federally negotiated indirect cost rate for FY 01-02 off campus	26.6	(*n* = 55)
on campus	55.95	(*n* = 76)
Percentage of allocated faculty salary dollars raised from grants, etc,. directly returned to your department	71.04	(*n* = 48)
Percentage of indirect costs returned to your department	17.01	(*n* = 44)
Percentage of total faculty salaries derived from research grants (do not include fringe benefits costs)	34.16	(*n* = 74)

Table 5. Complete Ranking According to Total Dollars

Rank	Total Dollars	Rank Research Grant Dollars	Research Grant Dollars	Rank Research Dollars/ Faculty	Research Dollars/ Faculty	Rank Total Research Space	Research Space (sq. ft.)	Rank Research Dollars/ sq. ft.	Research Dollars/ sq. ft.	No. of Faculty
1	$20,930,054	1	$15,339,578	1	$958,724	9	31,125	2	$493	16
2	13,837,268	2	10,292,103	8	343,070	14	26,333	6	391	30
3	11,801,540	10	6,213,284	7	365,487	5	33,994	41	183	17
4	11,176,304	3	7,921,803	2	609,369	32	18,218	3	435	13
5	10,824,566	9	6,745,956	11	321,236	6	33,720	36	200	21
6	10,776,855	7	6,908,291	6	383,794	1	37,578	40	184	18
7	10,343,748	5	7,646,183	4	424,788	24	21,662	10	353	18
8	10,212,534	18	5,413,046	12	318,414	48	12,681	4	427	17
9	9,929,907	4	7,709,512	15	285,537	22	22,637	11	341	27
10	9,842,840	8	6,907,495	13	287,812	7	32,805	34	211	24
11	9,766,492	13	5,804,133	33	200,143	19	23,039	23	252	29
12	9,444,394	12	5,816,251	10	323,125	2	36,092	47	161	18
13	9,420,139	6	7,159,814	9	340,944	10	30,519	28	235	21
14	8,922,315	37	3,031,437	18	275,585	56	10,124	18	299	11
15	8,881,167	14	5,670,006	39	189,000	11	27,490	35	206	30
16	8,717,074	17	5,414,530	37	193,376	20	22,823	27	237	28
17	8,558,126	16	5,445,994	19	272,300	37	16,227	12	336	20
18	8,035,169	24	4,771,571	28	227,218	12	26,696	43	179	21
19	7,938,000	11	6,000,000	3	428,571	31	20,008	17	300	14
20	7,893,655	15	5,497,225	5	392,659	17	23,932	29	230	14
21	7,751,145	20	5,105,800	20	268,726	8	32,665	48	156	19
22	7,299,999	29	3,845,270	51	153,811	3	35,493	66	108	25
23	7,287,130	28	3,900,000	36	195,000	42	14,116	20	276	20
24	7,216,319	19	5,179,559	31	207,182	46	13,479	7	384	25
25	7,199,421	27	4,510,574	42	187,941	15	26,234	44	172	24
26	6,810,949	21	4,946,910	23	260,364	28	20,381	24	243	19
27	6,732,981	31	3,409,153	16	284,096	70	5,404	1	631	12
28	6,730,044	30	3,798,396	34	199,916	47	127,165	19	299	19
29	6,622,849	22	4,800,000	38	192,000	16	24,522	37	196	25
30	6,571,198	33	3,192,714	43	187,807	26	20,521	49	156	17
31	6,454,287	25	4,740,228	29	225,725	33	17,327	21	274	21
32	5,665,667	36	3,032,822	47	168,490	30	20,104	50	151	18
33	5,338,035	42	2,748,208	62	109,928	18	23,891	65	115	25
34	5,311,266	43	2,738,711	26	228,226	36	16,259	46	168	12
35	5,079,511	41	2,794,145	45	174,634	29	20,269	53	138	16
36	4,972,035	35	3,088,877	17	280,807	58	9,810	15	315	11
37	4,781,349	39	2,901,136	22	263,740	39	15,150	39	191	11
38	4,694,794	23	4,775,898	27	227,424	23	22,084	32	216	21
39	4,693,241	45	2,665,423	53	140,285	62	8,350	14	319	19
40	4,614,476	46	2,659,412	52	147,745	27	20,464	57	130	18
41	4,478,760	55	1,804,330	30	225,541	51	12,251	51	147	8
42	4,384,565	38	2,952,996	25	246,083	45	13,512	31	219	12
43	4,372,097	63	1,307,226	71	52,289	13	26,500	71	49	25
44	4,282,954	44	2,667,200	48	166,700	44	13,648	38	195	16
45	4,162,057	52	2,050,248	59	120,603	38	15,511	56	132	17
46	4,119,000	54	1,923,000	58	128,200	35	16,292	62	118	15
47	3,934,532	40	2,851,868	24	259,261	60	9,118	16	313	11
48	3,837,398	34	3,160,420	14	287,311	41	14,857	33	213	11
49	3,835,682	48	2,434,428	46	173,888	55	10,257	26	237	14

Table 5. Complete Ranking According to Total Dollars

Rank	Total Dollars	Rank Research Grant Dollars	Research Grant Dollars	Rank Research Dollars/ Faculty	Research Dollars/ Faculty	Rank Total Research Space	Research Space (sq. ft.)	Rank Research Dollars/ sq. ft.	Research Dollars/ sq. ft.	No. of Faculty
50	3,825,528	47	2,467,875	44	176,277	25	21,430	64	$115	14
51	3,757,912	51	2,139,030	21	267,379	69	6,566	13	326	8
52	3,742,679	49	2,265,923	41	188,827	49	12,500	42	181	12
53	3,722,320	56	1,743,035	68	79,229	21	22,779	70	77	22
54	3,699,448	59	1,627,120	54	135,593	59	9,558	45	170	12
55	3,598,181	32	3,396,641	35	199,802	63	8,227	5	413	17
56	3,595,938	62	1,415,575	63	108,890	53	10,991	58	129	13
57	3,453,619	50	2,144,321	65	102,111	34	16,699	59	128	21
58	3,373,516	53	2,040,233	49	156,941	66	7,793	22	262	13
59	3,155,931	73	204,566	72	25,571	64	8,102	75	25	8
60	3,005,160	61	1,495,207	66	93,450	54	10,765	52	139	16
61	2,910,919	57	1,726,260	55	132,789	67	7,253	25	238	13
62	2,852,394	64	1,301,890	57	130,189	40	14,881	68	87	10
63	2,712,354	68	844,042	70	52,753	68	6,950	60	121	16
64	2,505,809	72	428,500	73	23,806	52	11,635	73	37	18
65	2,331,482	58	1,700,923	40	188,991	50	12,470	54	136	9
66	2,230,908	65	1,162,644	60	116,264	57	9,882	63	118	10
67	2,229,764	66	1,155,000	61	115,500	43	14,116	69	82	10
68	2,140,646	69	757,262	69	63,105	65	8,023	67	94	12
69	1,739,958	60	1,622,232	32	202,779	71	4,570	9	355	8
70	1,668,245	67	850,115	64	106,264	72	3,760	30	226	8
71	1,000,478	76	114,541	76	16,363	61	8,483	77	14	7
72	914,470	75	115,000	75	19,167	76	2,600	72	44	6
73	830,212	74	118,000	74	23,600	73	3,741	74	32	5
74	805,020	70	523,841	56	130,960	77	1,404	8	373	4
75	596,019	77	65,775	77	13,155	75	3,527	76	19	5
76	509,849	78	0	78	0	78	0	78	0	2
77	504,360	71	443,700	67	88,740	74	3,688	61	120	5
78	0	26	4,695,887	50	156,530	4	35,468	55	132	30

Gift Planning Opportunities

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

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

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

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

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

For more information on gift giving to the APS, please contact Martin Frank, Executive Director (Tel.: 301-634-7118, Email: mfrank@the-aps.org), or Robert Price, Director of Finance (Tel.: 301-634-7173, Email: rprice@the-aps.org)

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*Transferred from Student Membership

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Leonard F. Arnolda
Royal Perth Hosp., Australia
Carol Asher
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Santhosh M. Baby
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Univ. of California, San Diego
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Univ. of Queensland, Australia
Yoshifumi Kawanabe
Brigham and Women s Hosp., MA
Jane Leopold
Whitaker CVI-Boston Univ., MA
Zhonghua Li
Univ. of Tennessee HSC
Xiaoqiu Liu
Univ. of California
Xiao Lu
Univ. of California, Irvine
Rong Ma*
Univ. of Oklahoma HSC
Elisa Magosso
Univ. of Bologna, Italy
Glenn A. McDonald
Univ. of Texas, Houston
Bruce A. Molitoris
Indiana Univ.
James R. Moyer, Jr.
Univ. of Wisconsin, Milwaukee
Suzanne L. Munns
Univ. of California, Irvine
Matthias Nahrendorf
Universitat Wurzburg, Germany
Koichi Nakayama
Univ. of Shizuoka, Japan
Brendon Stewart Noble
Univ. of Edinbourgh, Scotland
Earl G. Noble
Univ. of Western Ontario, Canada
Phillip S. Oates
Univ. of Western Australia
Toshimasa Osaka
Nat l. Inst. Health/Nutrition, Japan
Michel Pare*
AstraZeneca, Canada
Geoffrey W. Payne
John B. Pierce Laboratory, CT
Ilka Pinz
Brigham & Women s Hosp., MA
Karen I. Plaut
Univ. of Vermont
Robert Porszasz
Debrecen Univ., Hungary
Fabrice Prieur
Univ. of Artois, France
Eric Raddatz
Univ. of Lausanne, Switzerland
Michael Rubart
Indiana Univ. School of Med.
Seema Saksena
Univ. of Illinois, Chicago
Albert G. Sarkis
Medical College of Wisconsin
Fred R. Sattler
Univ. of Southern California
Edward Todd Schroeder
Univ. of Southern California
Stylianes P. Scordilis
Smith College, MA
Enn Seppet
Univ. of Tartu, Estonia
Qing Song
Morehouse School of Medicine, GA
Larry Allen Sonna
USARIEM, Natick, MA
Jorge M. Suarez
Univ. of California, San Diego
Dusan Suput
Ljubljana-Inst. of Pathophysiol., Slovenia
Dalton J. Surmeier
Northwestern Univ. IL
Judith Catelli Sved
Univ. of Pittsburgh, PA
Xiao-Di Tan
Children s Mem. Hosp., Chicago, IL
Leslie Tung
Johns Hopkins Univ., MD
Peter V. Usatyuk
Johns Hopkins Univ., MD
Matt M. Vijayan
Univ. of Waterloo, Canada
Lee Wen-Shin
Taipei Vet. Gen. Hosp., Peoples Rep. of China
Xu Wang
Univ. of Med. Dentistry, NJ
Jeremy P. T. Ward
King s College London, UK
Burton M. Wice
Washington Univ. Sch. of Med., MO
Jianye Xu
Louisiana State HSC
Baojian Xue
Univ. of Missouri, Columbia
Xiao-Ping Yang
Henry Ford Hosp., Detroit, MI

New Student Members

David L.C. Alders
Inst. for Cardio. Res., Amsterdam
Annette A. Angus
California State Univ.
Alena Banasova
Charles Univ., Czech Republic
Traly Becker
Idaho State Univ.
Shawn B. Bender
Ohio Univ.
Arthur R. Bouwman
Vrije Univ. Med. Ctr., Amsterdam
Jacquelyn Jo Bower
Natl. Inst. for Occ. Safety & Hlth, WV
Holly N. Brevig
Univ. of California, Irvine
Dalibor Breznan
Health Canada, Ontario
Keith R. Brunt
Univ. of Saskatchewan, Canada
Sean M. Burke
San Diego State Univ., CA
Nellie E. Byun
Vanderbilt Univ., TN
Fernanda R.O. Calderon
Univ. of Hawaii
Justin S. Catches
Georgia Southern Univ.
Yongyae Chen
Univ. of Texas Med. Branch
Gurunadh Reddy Chichili
Univ. of Holenheim, Germany
Robert C. Clipsham
Univ. of California, Los Angeles
Chandra M. Coleman
St. Louis Univ., MO
Kara Joyce Collins
Univ. of Louisville, KY
Erik Michael Conrad
Univ. of North Florida
Emily Ann Cordas
Dartmouth Med. Sch., NH
Yun Dai
Univ. of Mississippi Med. Ctr.
Daisy La Dawn Daubert
Oregon Health Sciences Univ.
Robert Bryan Dorman
Univ. of Arkansas for Med. Sciences
Scott D. Doughman
Univ. of Wisconsin, Madison
Craig A. Emter
Univ. of Colorado
Michelle M. Farberman
St. Louis Univ., MO
Mario A. Ferrari
Univ. of Santos, Brazil
Joan P. Forder
Medical College of Wisconsin
Nicole J. Garbarini
Vanderbilt Univ., TN
Nilanjan Guha
St. John s Univ., NY
Sepideh H. Hagvall
Sahlgrenska Univ. Hosp., Sweden
Elaina L. Hall
Lake Superior State Univ., MI
Darren S. Hoffmann
Univ. of Iowa
Susan F. Hudachek
Colorado State Univ.
Cory C. Jackson
Univ. of Calgary, Canada
Yi Jing
West Virginia Univ.
Rick K. Johns
Univ. of Arizona
Kamisha L. Johnson-Davis
Univ. of Utah
Jainuch Kanchanapoo
Mahidol Univ., Thailand
Muralidhar Kannan
Univ. of Louisville, KY
Adite Khera
Univ. of Houston, TX
Syed Ali Khurrum
Pepperdine Univ., CA
Ellen Krimitsos
Univ. of New England
Lei Li
SUNY, Downstate Med. Ctr., NY
Willmann Liang
Univ. of British Columbia, Canada
Mike T. Lin
Loma Linda Univ., CA
Jennifer L. Losapio
St. Louis Univ., MO
John David Lowman
Virginia Commonwealth Univ.
Adam Lee MacDonald
Univ. of Brighton, UK
Cheri L. Mackenzie
McMaster Univ., Canada
Rolando A. Maldonado
California State Univ.
Maria Maraki
Harokopio Univ., Greece
Melissa Marie Markofski
California State Polytechnic
Christopher Mazzochi
Univ. of Alabama, Birmingham
Gregory T. Mullen
Univ. of Northern Colorado
Sajio A. Noor
Univ. of Delaware
Wendy O Neill
Univ. of Guelph, Canada
Prithwish Pal
Univ. of Rochester, NY
Cassandra Eugenia Palmer
North Carolina Central Univ.
Vit Perlik
Univ. of Tennessee
Andrew Philp
Univ. of Brighton, UK
Floreis J.G. Pietzsch
Univ. of Brighton, United Kingdom
Kenneth S. Pizzolitto
Univ. of Waterloo, Canada
Damon Todd Poburko
Univ. of British Columbia, Canada
Steven John Prior
Univ. of Maryland
Jennifer B. Ray
Kean Univ., NJ
Janet Marie Rice
Univ. of Missouri, Kansas City
Jenny Renee Roberts
Nat. Inst. for Occ. Safety & Hlth, WV
Hector Romo-Parra
Natl. Univ. of Mexico
Marjon Hendrika Roos
Virje Univ. Med. Ctr., Amsterdam
Jamie H. Rosenblum
Harvard Sch. of Public Health, MA
Monica B. Sandberg
Univ. of Southern California
Aurora Shehu
Univ. of Illinois, Chicago
Jill Lynn Smith
St. Louis Univ., MO
Kerri-Jo Smithurst
Univ. of Guelph, Canada
Norman Earl Taylor
Medical College of Wisconsin
Michael Anton Tevold
Virginia Commonwealth Univ.
Valory Rae Anna Thatcher
Portland State Univ., OR
David M. Thomson
East Carolina Univ., NC
Mingjie Tong
Univ. of Toledo, OH
Jannine Giang Troung
Univ. of Utah
Abigail D. Turpyn
Virginia Polytechnic Inst.
Jeric Uy
Univ. of Adelaide, Australia
Marco Edwin Van Teijlingen
Vrije Univ., Amsterdam
Mark Paul Walberg
Univ. of California, Los Angeles
Shu-Jung Wang
Kaohsiung Med. Univ., Taiwan

Laura E. Willems
Griffith Univ., Australia
Feng Wu
Univ. of Western Ontario, Canada
Soo Jin Yang
Univ. of California, Davis
Linda Yip
Univ. of British Columbia
Alejandra Young
California State Univ., Northridge
Yongge Zhao
Univ. of Pittsburgh, PA
Zhifang Zhao
Univ. of Texas, Galveston
Lan Zhou
Univ. of Mississippi Med. Ctr.

New Affiliate Member

Howard J. Thiery
Greater Hartford Academy, CT

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Vol. 46, No. 3, 2003

Frontiers in Physiology: Integrating Inquiry, Equity and the Internet
2003 Teacher and Research Host Awards

APS is pleased to announce the 2003 awardees for the Frontiers in Physiology Professional Development Fellowship. This nationwide fellowship pairs a middle or high school teacher with an APS member to conduct research during the summer. Other components of the fellowship include a weeklong teaching forum during which the teachers explore inquiry-based teaching, physiology lessons, the use of the Internet in the classroom and equity issues in science education. The Fellowship continues after the summer as the teachers participate in online professional development units and develop and field-test of their own inquiry-based classroom activity and concludes when the teachers attend Experimental Biology 2004.

More information is available at http://www.the-aps.org/education/frontiers/index.htm. ❖

2003 Frontiers in Physiology Professional Development Fellowship Awardees and their APS Hosts

Christin Arnini
Cooperative Arts & Humanities High School, New Haven, CT
Host: Michael J. Caplan
Yale Univ. School of Medicine, CT

Barbara Behnke
Winamac Community High School, Winamac, IN
Host: Kenneth R. Olson
Indiana Univ. School of Medicine

Rebecca Carney
Sherwood Gaines Middle School, Durham, NC
Host: Jo Rae Wright
Duke Univ. Medical Center, NC

Timothy Craddock
Benito Juarez Community Academy, Chicago, IL
Host: Robert B. Robey
Univ. of Illinois at Chicago College of Medicine

Timothy Crane
James River High School, Midlothian, VA
Host: John R. Grider
Medical College of Virginia, Virginia Commonwealth Univ.

Linda Dearth-Monroe
Warren Central High School, Indianapolis, IN
Host: Martin Kaefer/C. Subah Packer
Indiana Univ. School of Medicine

Melissa Gildehaus
Rock Bridge High School, Columbia, MO
Host: Mark A. Milanick
Univ. of Missouri

Melissa Maringer
Buckeye Valley High School, Delaware, OH
Host: Paul M. L. Janssen
Ohio State Univ.

Bonnie Moody
Cabot Junior High School, Cabot, AR
Host: Parimal Chowdhury
Univ. of Arkansas for Medical Sciences

Sandra Nichols
James Island Middle School, Charleston, SC
Host: George Tempel
Medical College of South Carolina

Mary O'Leary
St. Andrews School of Math and Science, Charleston, SC
Host: George Tempel
Medical College of South Carolina

Sonal Patel
Pomona High School, Pomona, CA
Host: Steven J. Wickler
California Polytechnic Univ.

Elizabeth Quick
John Marshall High School, San Antonio, TX
Host: Dean L. Kellogg, Jr.
Univ. of Texas Health Science Center at San Antonio

Larissa Raven
Emerson High School, Union City, NJ
Host: Jeffrey W. Holmes
Columbia Univ.

Alita Thompson
New Endeavors Separate School, North Charleston, SC
Host: George Tempel
Medical College of South Carolina

Judy Toledano
Lakeland Copper Beech Middle School, Yorktown, NY
Host: John G. Edwards
New York Medical College

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Welcome to University of Nebraska at Kearney's Local Outreach Team

In September 2002, the APS Education Office welcomed a new Local Outreach Team (LOT) to the Frontiers in Physiology program. The University of Nebraska at Kearney s LOT is led by APS member **Janet E. Steele** and includes members from local school districts and researchers from area universities and organizations. (See inset for the full list.) LOT participants traveled two+ hours by car, and the workshop facilitators flew in from Indiana for the January 17, 2003 Training Institute, and received a warm Nebraska welcome despite the cold weather.

Local Outreach Teams (LOTs) are the grassroots arm of the APS Frontiers in Physiology (http://www.the-aps.org/education/frontiers/index.htm) program. LOTs disseminate physiology-based curriculum and resources to middle and high school life science teachers via in-service workshops. A primary goal of the LOT program is to build connections between physiology researchers and local teachers and schools. The first LOTs were established in 1995 at the University of California, San Diego and Ohio State University. The program has grown steadily since then to a total of 25 LOTs across the country, ranging from Montana to New York to Texas to Wisconsin.

University of Nebraska at Kearney s Local Outreach Team

Janet Steele (LOT Leader)
Department of Biology
University of Nebraska at Kearney
Kearney, NE

Michael Derr
Executive Director
Edgerton Explorit Center
Aurora, NE

Joe Ford
Research Physiologist
USDA Meat Animal Research Ctr.
Clay Center, NE

Karen Gottsch
High School Science Teacher
Cambridge Public Schools
Cambridge, NE

Patrick Kudlacek
Dept. of Physiology & Biophysics
Univ. of Nebraska Medical Center
Omaha, NE

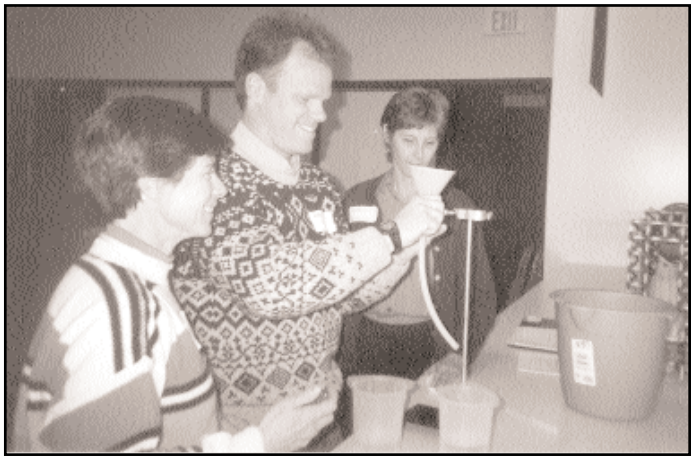
Vicki LePorte
High School Science Teacher
Lexington Public Schools
Lexington, NE

Thomas Pisarri
Department of Biomedical Sciences
Creighton University
Omaha, NE

Dan Widick
High School Science Teacher
Eustis Public School
Eustis, NE

The leaders of the LOTs are APS members. The teams include physiologists (and/or other biomedical researchers), local middle and high school teachers, and, often, representatives from the local school system. LOT leaders submit an application for funding to support their in-service workshops. APS members interested in starting an LOT can contact the Education Office (education@the-aps.org) for more information.

The APS Education Office organized a Training Institute for the new LOT members. For the University of Nebraska at Kearney (UNK) LOT, two veteran LOT participants traveled to Nebraska to facilitate the Training Institute **C. Subah Packer**, who in 1997 established the LOT at the Indiana University School of Medicine in Indianapolis, IN and Sandra Mahl, a teacher at Seymour Elementary School in Seymour, IN. The Training Institute took place on January 17, 2003 in Aurora, NE. Aurora was chosen as the midway point for the team members and the Edgerton Explorit Center, a hands-on science center, hosted the group in its training facility.



LOT members Janet Steele, the LOT team leader, Pat Kudlacek, and Karen Gottsch try their hand at one of the Elvis Experiments from the Physiology of Fitness unit for high school students.

LOT members demonstrate the relationship of exercise and the body tissue s need for oxygen. In the How Does Exercise Affect the Cardiovascular System activity, the muscle tissues (Michael Derr and Karen Gottsch) use up some of the blood s (Dan Widick s) oxygen as the heart (Joe Ford) prepares to move the blood back to the lungs for a refill.

Karen Gottsch checks Joe Ford s blood pressure in the What Effects Does Exercise Have on You? activity from the Physiology of Fitness Unit. LOT member, Michael Derr, the Executive Director of the Edgerton Explorit Center, observes Karen s technique.

The LOT Training Workshop facilitators, C. Subah Packer and Sandi Mahl, pause (briefly) for a photo before they head back to Indiana.

During the Training Institute, the UNK LOT worked through the entire Physiology of Fitness learning cycle unit, as well as explored the concepts behind inquiry-based learning and how to address equity in the science classroom. The workshop included doing hands-on inquiry-based physiology experiments that explore aspects of cardiovascular and respiratory physiology important in exercise and fitness. The Training Institute wrapped up with time for the UNK LOT to plan for its own workshops, which are scheduled for June 2 and June 9, 2003 at the university, and at the Nebraska Association of Teachers of Science annual conference in October 2003.

The LOT program is part of the Frontiers in Physiology program which is funded by the APS, the National Center for Research Resources (NCRR), Science Education Partnership Awards (SEPA Grant #RR15251), and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK Grant #DK 39306) at the National Institutes of Health. ❖

CiteTrack: Your Free Email-Alerting Service Finds Articles You Might Have Missed

We continue to present the features of the new portal site from the Stanford s HighWire Library of Sciences and Medicine, which allows you to search all of Medline as well as full-text articles from over 360 journals, including all of the APS journals. The portal site is at http://highwire.stanford.edu.

When HighWire Press interviewed scientists about their needs for information retrieval and access, one of the major points was that researchers and their labs could scan only a few dozen journals among a lab team in terms of examining them for important articles. One lab reported on an informal time-limited study in which they found 30 articles related to the lab s work in their usual journals, but when they looked broadly across many other journals, they found another 30 articles that were relevant and would have been overlooked.

HighWire s new portal has a solution to this problem. It s called CiteTrack, a free automated alerting service that can alert you on articles that match your interests by daily checking all new content in Medline and all of the new full-text articles in over 360 HighWire-based journals. You can focus on your core journals and let the CiteTrack service track hundreds or thousands of other journals for you.

If CiteTrack finds a match with a term or author you have specified, you will get an Email the same day the article is published. The Email gives you the full author/title/citation to the newly published article plus a hyperlink to get you right to it.

You can register as many CiteTrack alerts as you would like, each with a different set of keywords and/or authors. You can also be alerted when articles of interest to you are cited and see who cited them (perhaps citations to your own articles!). You can tell CiteTrack to look only in particular journals (perhaps the ones in your journal club), in journals that publish in particular topics, in all 360+ HighWire-based journals full-text articles, or across all of HighWire plus all of Medline (over 4,500 journals). The choice is yours.

In the near future, you ll be able to tell CiteTrack that you are interested in certain topics defined by detailed subject categories and have CiteTrack tell you whenever new content is published in your favorite categories. This will allow you to match your specific interests without having to figure out all the possible keywords and authors that determine those interests. You ll be able to receive a daily or weekly list of articles published the table of contents for a virtual journal that matches just your interests.

How to set up CiteTrack alerts:

Just click on the My Email Alerts link on the HighWire home page at http://highwire.stanford.edu. From the My Email Alerts page you can create an alert by author, by words in the title or abstract, or by text anywhere in an article.

The My Email Alerts page also shows you all your Email tables of contents alerts (eTOCs) as well as allows you to sign up for having content delivered to your Palm/PDA. You can also decide to be notified when the Articles in PresS (articles published

Figure 1.

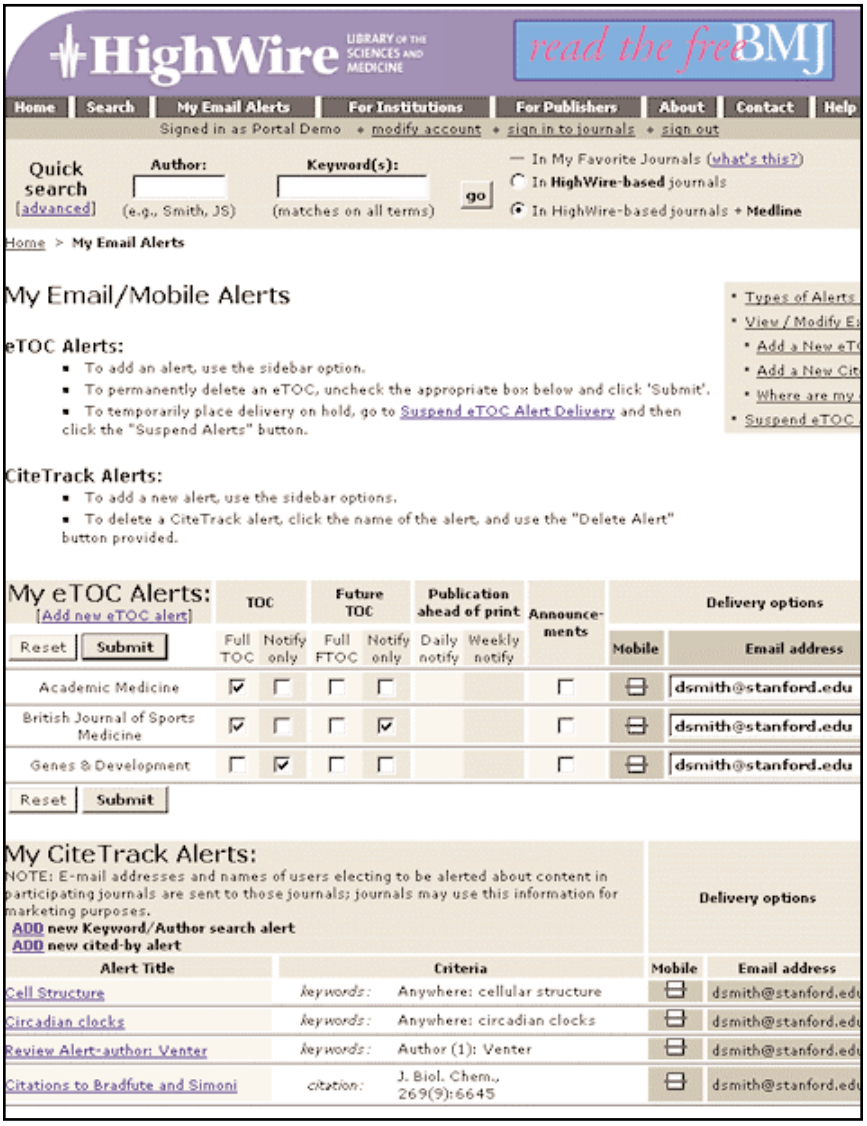
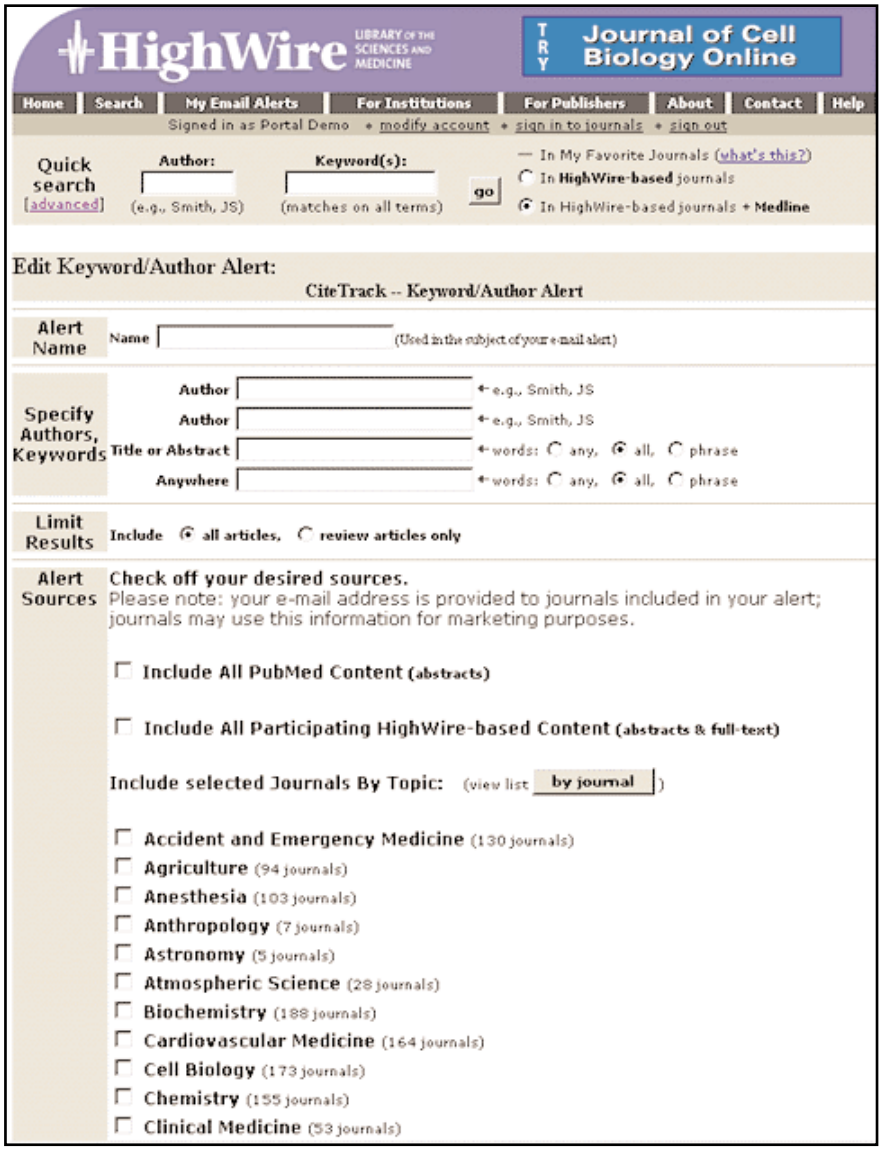


Figure 2.



ahead of print) are published in your journal of choice.

Figure 1 shows the summary of alerts you will get on the My Email Alerts page. If you look for the links to Add an alert, you ll see how to create a new alert. Figure 2 shows how easy it is to add an alert once you ve clicked on the Add link from the previous page: you just fill out a form as if you were going to do a search! In fact, this is the way CiteTrack works: it does a search for you, and whenever it retrieves something it hasn t retrieved before, it emails you. (The partial list of topics is shown in Figure 2.)

If you are not a registered user of the HighWire portal or haven t signed in when you clicked on My Alerts, you ll see a link to register or sign in. Registration takes only a minute or two; it s fast and free. And once you ve registered, other new features discussed in this series become available to you, such as My Favorite Journals. ❖

APS Unveils an Open Access Choice for Authors of *Physiological Genomics*

Starting July 1, 2003, authors of APS s newest journal, *Physiological Genomics*, can choose to pay a $1,500 fee to have their article published online with Open Access from the first date of publication or choose to pay no author fees and leave their article under Subscription Access. Open Access means that those online articles are completely free to any person or any library. All online content associated with that article (text, figures, supplemental material) is freely accessible.

Here s how it works:

Upon acceptance, the author will be asked to download a form, where he or she will choose author-fee-based Open Access or Subscription Access. If Open Access is chosen, the author will be asked to provide a credit card number, purchase order, or check for $1,500. Once the payment or purchase order is processed, that online article will be made free to all. The print and online journal containing the article will still be available for a subscription fee, but that article will be free online because the author has paid the fee. ❖

Boron New Editor of *News in Physiological Sciences*

Walter Boron, Professor of Cellular and Molecular Physiology at the Yale University School of Medicine, will succeed **Stanley Schultz** as the Editor of *News in Physiological Sciences* on July 1, 2003. Boron was born in Elyria, OH, where he received his education through high school. He attended St. Louis University where he earned an AB in chemistry *summa cum laude* in 1971. Boron then entered the Medical Scientist Training Program at Washington University in St. Louis where he did his graduate work under the tutelage of **Albert Roos** in the Department of Physiology and Biophysics. Boron received his MD and PhD degrees in 1977. After remaining with Roos for one year as a postdoctoral fellow, Boron moved as a postdoctoral fellow to the Department of Physiology at Yale in 1978, and joined the laboratory of Emile Boulpaep. In 1980, Boron joined the faculty of that department. He was promoted to Associate Professor in 1984 and Professor in 1987. Between 1989 and 1998, he served three three-year terms as Chairman of the Department.

As a graduate student, using microelectrodes to measure intracellular pH (pH_i) in squid giant axons and giant-barnacle muscle fibers, Boron was one of the first to monitor transient changes in pH_i. With **Paul De Weer**, Boron observed and elucidated the pH_i changes caused by applying and withdrawing NH_3/NH^+_4 or CO_2/HCO_3. The result was the introduction of the NH^+_4 prepulse technique, which is still widely used to acid load cells, as well as the first dynamic evidence that cells actively regulate their pH. The work that Boron did with DeWeer and with **John Russell** was pivotal in the initial description of the Na^+-driven Cl-HCO_3 exchanger, the first acid-base transporter implicated in pH_i regulation. As a postdoctoral fellow, Boron, together with Boulpaep, discovered the electrogenic

Walter Boron

Na/HCO_3 cotransporter, which plays a central role in HCO_3 reabsorption in the renal proximal tubule.

As an independent investigator at Yale, Boron continued to elucidate mechanisms of pH_i regulation, and has more recently focused in three related areas: the molecular physiology of Na^+-coupled HCO_3 transporters, CO_2 permeability, and CO_2 sensors. Regarding general principles of pH_i regulation, Boron and his coworkers were among the pioneers in using pH-sensitive dyes for monitoring pH_i. They also developed now-standard paradigms for measuring the pH_i dependencies of intracellular buffering power and the rates of acid-base transporters. By applying these paradigms to serum-starved cells studied in the presence versus the absence of HCO_3, they disproved the theory that growth factors act by raising pH_i. Another product of this line of research was the discovery that, for most cells, the Na-H exchanger is rather active at the resting pH_i. Regarding the molecular physiology of HCO_3 transporters, his group cloned the cDNA for the first Na^+-coupled HCO_3 transporter the renal electrogenic Na/HCO_3 cotransporter. They also cloned and characterized the electroneutral Na/HCO_3 cotransporter and the Na^+-driven Cl-HCO_3 exchanger, and continue to elucidate mechanisms of action and structure-function relationships for all of the above transporters. Regarding CO_2 permeability, the work of Boron s group on isolated-perfused gastric glands and colonic crypts led to the discovery of gas-impermeable membranes. Most recently, Boron s group has shown that water channels, such as AQP1, are permeable to CO_2 gas. His group also developed a novel rapid-mixing technique for making out-of-equilibrium CO_2/HCO_3 solutions with virtually any combination of $[CO_2]$, $[HCO_3]$ and pH. This approach, applied to the renal proximal tubule, has recently led to the first physiological description of a CO_2 sensor.

Boron has been an active member of APS since 1981. In the Renal Section, he served as Program Representative (1984 1987) and later as Chair of the Renal Section (1990 1993). The Berliner Lectureship was established during his tenure as Chair. Boron served on the APS Council (1995 1998) and then as President-Elect/President/Past-President (1998 2001). The Strategic Planning Meeting at Kiawah Island was held during his Presidency. With the Society of General Physiologists, Boron served as Treasurer (1988 1991).

Boron s editorial experience includes membership on the Editorial Boards of the *American Journal of Physiology-Renal, Fluid and Electrolyte Physiology* (1984 1988) and the *Journal of Physiology (London)* (1985 1992). With the *Annual Review of Physiology*, he was a Special Section Editor of volume 48 in 1986. With *Physiological Reviews* he was Associate Editor (1985 1990) and then Editor (1994 1999). Finally, together with Boulpaep, Boron edited a new, comprehensive textbook for medical and graduate students, *Medical Physiology. A Cellular and Molecular Approach*, which was published by Saunders in 2003.

Boron was a Searle Scholar from 1981 1984. He won the Young Investigator Award of the American Society of Nephrology and the American Heart Association in 1986. For excellence in teaching at Yale, Boron received the Charles W. Bohmfalk Teaching Award in 1993. That same year, he received the Robert F. Pitts Lectureship Award from the Renal Commission of the International Union of Physiological Sciences. In 1998, he received the Carl W. Gottschalk Distinguished Lectureship Award from the Renal Section of the American Physiological Society. That same year, he was also elected a Fellow of the American Association for the Advancement of Science. Boron s research is funded by the National Institutes of Health and the Office of Naval Research. In 2002, Boron received a MERIT award from the NIDDK. ❖

Cowley New Editor of *Physiological Genomics*

On July 1, 2003, **Allen W. Cowley, Jr**., Professor and Chairman of the Department of Physiology at the Medical College of Wisconsin, will be the new editor of *Physiological Genomics*. Cowley completed his PhD degree training in physiology in 1968 with John Scott at Hahnemann Medical School in Philadelphia, PA. He then joined **Arthur Guyton** at the University of Mississippi Medical Center for postdoctoral training in 1968 and continued in that department until 1980. He was visiting professor of physiology at Harvard Medical School in 1974 and 1975, working with **Clifford Barger** and **Claude Lechene**. In 1980, he was appointed the Chairman of the Department of Physiology at the Medical College of Wisconsin in Milwaukee, WI.

The central theme of his research has been related to the study of renal and vascular mechanisms involved in the long-term control of arterial pressure. His research during the first decade of his career was focused on whole animal systems physiological studies of cardiovascular and renal function. During the past decade, his research has focused additionally on the applications of molecular genomics to the understanding of complex physiological processes.

His early work on the baroreceptor reflexes in dogs demonstrated that although the baroreceptors participated importantly in the short-term stabilization of arterial blood pressure, they did not determine the long-term set point around which arterial pressure oscillated. He pioneered the use of continuous, 24-hour recording techniques coupled with computer averaging to quantify long-term average levels of arterial blood pressure and demonstrated that sinoaortic baroreceptor denervation did not alter the average level of blood pressure. His work with the renin-angiotensin and the vasopressin systems represented the first studies to quantitate the open-loop feedback gain of these blood pressure control systems.

Allen W. Cowley, Jr.

Much of Cowley s work has focused on achieving an understanding of the relationship between body fluid volume and arterial pressure regulation and the integration of these two elements. Studies in his laboratory and his collaborations uncovered the importance of medullary blood flow and related changes in renal interstitial pressure mechanism of pressure-diuresis. He has pioneered studies in conscious rats exploring the role of the renal medulla and demonstrated that small reductions of blood flow to the renal medulla alone can result in sodium retention and hypertension. Studies in his laboratory have also demonstrated that chronic elevations of blood volume as small as five percent could result in locally induced increases (autoregulation) of total systemic vascular resistance supporting the hypothesis that initial reductions of renal excretory function with only small expansion of blood volume can lead to significant increases of systemic vascular resistance.

Since 1993, his work has been directed toward searching for regions on rat and human chromosomes that segregate with the physiological pathways that determine arterial blood pressure (quantitative trait loci) using human subjects and inbred lines of rats. The applications of molecular genetics to the understanding of physiological function represents the central theme of most of his current research. This work has recently culminated in the first comprehensive systems biology genetic map of cardiovascular function published in *Science* in 2001. With the sequencing of the rat genome now complete, Cowley is now

(continued on page 108)

(continued from page 107)
using techniques of chromosomal substitution in rats (consomic and congenic) together with large DNA expression arrays to determine the relationship of specific genetic pathways to complex physiological and pathophysiological pathways.

Cowley has authored more than 235 publications and has contributed chapters to 32 books. He has been an active member of the APS since 1972, serving as Councillor for the Society for five years, Chairman of the Water and Electrolyte Homeostasis Section and most recently, President of the Society in 1998. He has also served on the executive councils of several other scientific societies, including the American Heart Association (AHA) Council for High Blood Pressure Research, the AHA Basic Science Council, and the Inter-American Society of Hypertension. He has served as Chairman for the Council for High Blood Pressure Research of AHA and as President of the Association of Chairmen of Departments of Physiology. He currently serves as the President of the International Union of Physiological Sciences. He has served on numerous NIH study sections including the NHLBI Advisory Council and has served on more than 10 editorial boards, including three journals of APS.

Cowley is director of the NIH Specialized Center for Hypertension Research at the Medical College of Wisconsin, which has as its emphasis the search for genes responsible for high blood pressure. He directs the NIH Program Blood Pressure-Determinants and Controllers now in its 26th year of continuous funding. He co-directs an NIH Program of Genomic Applications (PGA) for the development of genetic model organisms that will link genes to function. He is the director of a NIH training grant in high blood pressure research and, throughout his career, has trained more than 30 postdoctoral fellows and students. He received the Distinguished Achievement Award of the Scientific Councils of the AHA in 1996 and the Novartis Award from the Council for High Blood Pressure Research of the AHA in 1997. He was the 1996 Ernest H. Starling Distinguished Lecturer of the APS Water and Electrolyte Homeostasis Section and the 2002 recipient of the Walter B. Cannon Award of the APS. ❖

Montrose New Editor of *AJP-Gastrointestinal and Liver Physiology*

Marshall (Chip) Montrose, Professor of Cellular and Integrative Physiology at Indiana University, will succeed **Martin Kagnoff** as Editor-in-Chief of the *American Journal of Physiology-Gastrointestinal and Liver Physiology* in July 2003. Born in Bethesda, MD (under the shadow of the NIH from an early age), he received his BS in Mathematics and Zoology from the University of Maryland in 1977. After working as a technician at the NIH for two years, he decided to pursue a PhD in Biophysics under the watchful eye of **George Kimmich** at the University of Rochester, NY. Graduating in 1984, he went to Switzerland for joyful postdoctoral work with **Heini Murer**. In 1988, **Mark Donowitz** bravely recruited him to join the GI Division in the Department of Medicine at Johns Hopkins University as Assistant Professor, despite the fact that his postdoctoral work was in

Chip Montrose

renal epithelial cells. After ten years at Johns Hopkins, he took his current position at Indiana University.

His research has been dominated by developing an understanding about the membrane physiology of gastrointestinal epithelial cells, with a passion for understanding acid/base transport regulation. He recently realized that he has published research work on every segment of the GI tract from the mouth to colon. His recent application of advanced microscopy methods to living native tissue in vivo and in vitro have allowed unprecedented opportunities for exploring parts of cells and tissues that have historically defied deep analysis. Most notably, explorations of pH microdomains surrounding epithelial cells have both raised and answered questions about the regulation of acid/base transporters in the intimate spaces near membranes.

He has been an Associate Editor for *AJP-GI* and editorial board member for *AJP-Cell Physiology* for a number of years. He currently serves as a Councilor for the Intestinal Disorders section of the American Gastroenterological Association and also recently served as councillor for the Cell and Molecular Physiology Section of APS. ❖

Look for the Redesigned APS Web Site Coming in July

APS is proud to announce that a completely redesigned web site will be available soon. The new look was designed with the user in mind. We have added pop-up menus as well as department overview pages and quick links. APS goal is to make finding information on our web site as easy as possible for our users.

The popularity of the APS web site continues to grow. In 2001 APS averaged 681,00 hits per month and in 2002 we averaged over 940,000 hits a month, an increase of more than 38%. So far this year, APS is averaging over 1,000,000 hits a month. Also on the rise has been the number of distinct hosts to visit the APS web site. In 2001 there were an average of 18,435 distinct hosts and in 2002 the average was 29,548 distinct hosts, an increase of 38%. So far in 2003, APS is averaging 40,453 distinct hosts per month.

In our continuing efforts to make our web site user friendly, we added several new features in 2002 that include:

Online payment system (APS Store, Membership Dues, and Publication Subscriptions)

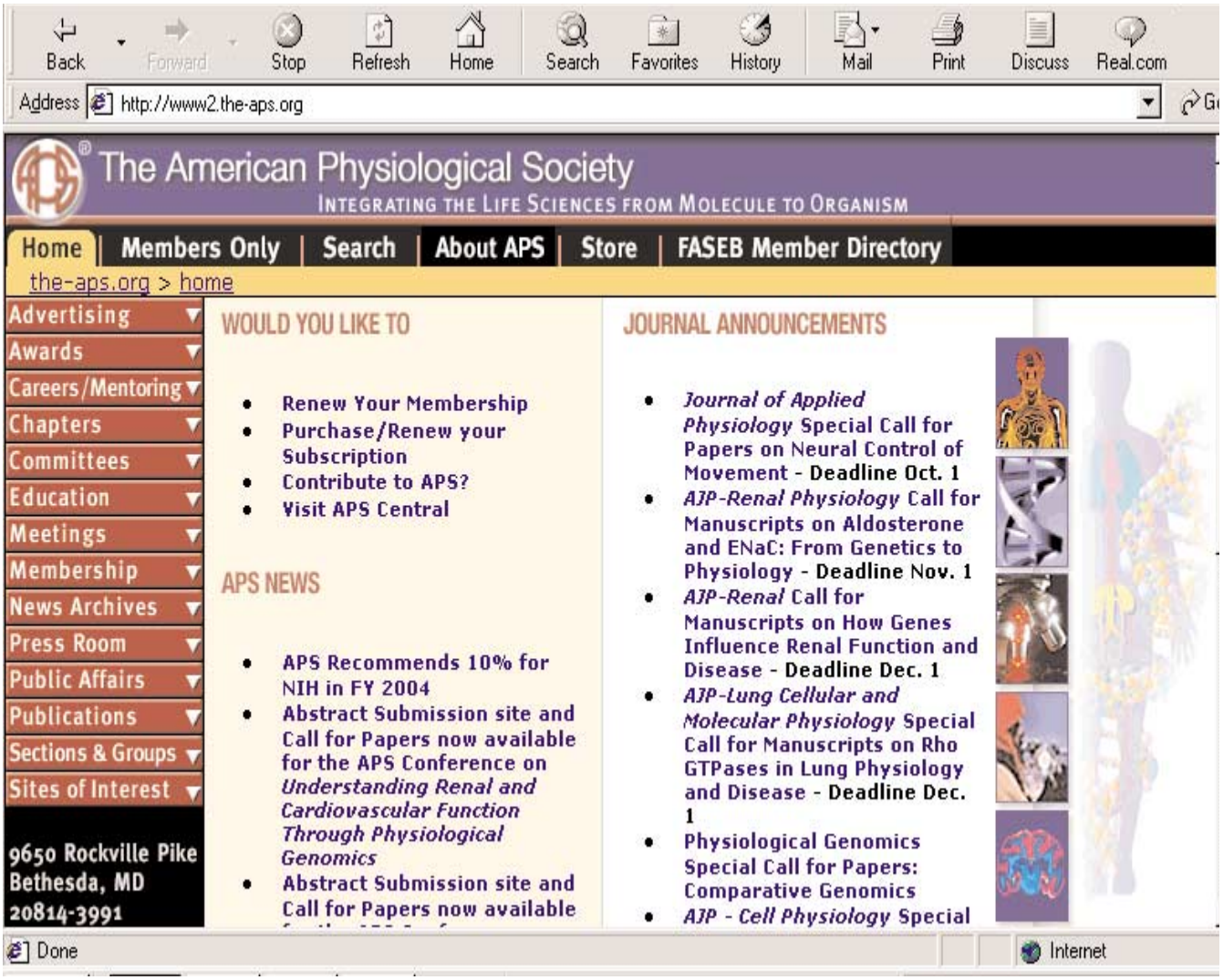
Legislative Action Center

Mentoring Section

Redesigned Careers Section

All have been great successes and very well received.

Please visit the APS web site often; we add new content daily. If you have any questions or comments, please forward them to the APS Webmaster at: webmaster@the-aps.org. ❖



APS Submits Testimony On FY 2004 NIH Funding

Each year the APS participates in the congressional budget process by submitting public witness testimony with recommendations for NIH funding. For the FY 2004 fiscal year that begins on October 1, 2003, the APS supports the recommendations of the FASEB Consensus Conference and the Ad Hoc Group for Medical Research Funding to provide the NIH with a 10% funding increase. This will enable the NIH to capitalize on the momentum achieved through doubling the agency s budget.

The APS statement on FY 2004 funding for the NIH is below.

Public witness testimony provides an opportunity for interested parties to tell Congress their views on government programs. This is one step along the road to the annual federal budget. According to the official legislative timetable, the budget process should start on the first Monday in February with the submission of the President s budget to Congress and should end no later than September 30, which is the last day of the fiscal year.

In reality, the road from the President s budget request to his signature on the finished appropriation is long and difficult both in terms of procedure and politics, and may extend days, weeks, or months into the next fiscal year. Along the way, the House and Senate each create a budget resolution based upon expected revenues as well as spending allowances for federal activities in broad categories such as defense, science, and health. The two chambers must then reconcile any differences between their two plans. Even as the Budget Committees are doing their work, the House and Senate Appropriations Committees hold hearings on the president s recommendations. They take testimony from cabinet secretaries, agency officials, and interested public witnesses. This is where testimony from the APS, FASEB, the Ad Hoc Group, and others come in.

Once the congressional budget resolution is in place, the Appropriations Committees divide up spending authority among the 13 subcommittees that actually draft the legislation that funds government agencies. NIH falls within the purview of the Labor-HHS-Education Subcommittees. Even though the House and Senate are working from the same budget resolution, they often divide up subcommittee allocations differently, and this can cause complications. Each subcommittee drafts its spending bill, which is approved first by the full committee and then by the House or Senate, as the case may be. Differences between the House and Senate versions of the bill must be reconciled by a conference committee. The resulting compromise legislation must then be approved by both Houses before being sent to the President for his signature. There is room to add or subtract funds from individual bills, but when the last appropriation bill is approved, total spending must conform to the approved budget plan. The complexity of this process naturally lends itself to a bumpy and winding road, which is exacerbated as Democrats and Republicans, Representatives and Senators, and Congress and the President all jockey to win support for their priorities.

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The American Physiological Society Statement on FY 2004 Funding For the National Institutes of Health

The American Physiological Society (APS) wishes to thank the Subcommittee for its support for the National Institutes of Health (NIH). The doubling of the NIH budget over the past five years has enabled the NIH to greatly enhance the scope of its research into a wide range of diseases, disabilities, and health challenges. This is a wise investment that will produce benefits in coming years for the people of our nation and the world.

The APS wishes to offer its recommendations for FY 2004 funding for the NIH. The APS is a professional association dedicated to advancing research and education in the physiological sciences. Physiology, which is the study of dynamic processes within the body, is the root of modern medical science. The Society was founded in 1887 and today has nearly 11,000 members in academic research institutions, industry, and government throughout the country.

Our nation s investment in NIH research has brought about enormous progress. Researchers have now completed a working draft of the human genome, giving us the framework to understand how genetics contributes to health and disease. However, mapping the genome is only the beginning. The promising new field of physiological genomics seeks to make the connection between genetic makeup and physiological function. Through physiological genomics we can determine how specific genes function and how genes influence our health, either alone or in concert with other genes and environmental factors.

The genomics revolution has already altered clinical practice in several areas of medicine. Newly identified gene mutations have been linked to specific diseases ranging from breast cancer to cardiomyopathy. The presence or absence of these mutations now guides clinicians in monitoring and treating these various diseases. Identifying these mutations has also helped us understand more fully how these diseases progress and better ways to treat them.

Inserting or deleting a gene usually gives us a good understanding of what it does. Because genes function in similar ways across species, in many cases it is possible to study what a gene does by inserting it into an animal. Many such transgenic animal models of disease are being developed through the addition or elimination of specific genes. This is an enormously important development for those who suffer from genetic diseases for which no therapy is currently available. Transgenic animal models make it possible to systematically study the effects of a disease and to develop ways to treat it.

Our Society recognizes that the United States faces challenges at home and abroad, and that you as Members of Congress must address

these challenges by balancing many competing needs. A commitment to the health of the nation through the continuing support of the NIH is one important contributor to finding solutions for many of the challenges that lie ahead. The APS therefore joins with the Federation of American Societies for Experimental Biology (FASEB) and the Ad Hoc Group for Medical Research Funding in recommending a 10% increase in FY 2004 to enable the NIH to sustain its research efforts.

The administration claims that its budget proposal will provide a 7.5% increase in NIH research. It further promises that this budget will enable the NIH to support the highest number of new and competing grants in history. However, a closer look reveals that these objectives would be achieved at the expense of other important aspects of the NIH program.

The 7.5% increase for research would be made possible by diverting resources from programs such as research training. This is shortsighted at a time when we are facing a serious workforce problem. Americans students have become increasingly unwilling to enter careers in biomedical research. This is rational behavior on their part. Research involves a long training period during which compensation is inadequate compared with other fields that require similar periods of education and training. Two years ago the NIH announced its intention to address this problem by increasing stipends by 10% per year for students in postdoctoral training. The plan was to make those increases until trainee compensation could be raised to appropriate levels. However, the administration s budget proposal abandons this effort because it provides only a 4% increase for trainee stipends.

The administration s budget rightly places an emphasis on research into defenses against chemical and biological weapons. However, it fails to provide adequate funding for on-going research into other health problems. Our nation must pursue a broad research program for many reasons. In the first place, while bioterrorism is a threat, there are other diseases that are already taking a toll on our people, and we need to respond to those needs. Secondly, a broad research program helps to develop a base of knowledge and skilled personnel to meet whatever health challenges we may face. Severe Acute Respiratory Syndrome (SARS) provides an excellent example of an emerging disease that poses an imminent threat to our nation s health. We need to be able to determine as quickly as possible how such diseases spread, what can be done to protect people against them, and what can be done to treat those who get the disease.

Another reason to keep our research efforts broad is the need to develop medically useful information from our knowledge of the genome. One of our great challenges in the decades ahead will be to determine how genes and proteins cause changes in physiology and behavior. This will be an enormous and difficult task because of its complexity, a complexity that far exceeds the challenge of decoding the human genome itself. Nevertheless, this is an important and worthwhile endeavor because the discoveries that are made will provide enormous benefits to human health.

One important feature of the President s FY 2004 budget proposal is $35 million for the Roadmap strategy developed by NIH Director Elias Zerhouni. Zerhouni developed this plan to enhance the effectiveness of the NIH. It identifies critical areas where additional attention is needed. The APS supports the NIH Roadmap as a thoughtful way to focus our investments now in ways that will address issues critical to future progress.

The APS urges this Subcommittee to build upon the foundation made possible through the doubling and provide the NIH with a 10% increase in FY 2004.

New Legislative Action Center

The American Physiological Society (APS) is pleased to announce a redesign of the Legislative Action Center. To visit the site, go to http://www.the-aps.org, and click first on Public Affairs and then on Legislative Action Center.

The new APS Legislative Action Center features news and action alerts about the use of animals in research, biomedical research issues, and how to become a research advocate. Special features include a guide to meeting with elected officials and the html and pdf versions of the brochure *Questions People Ask About Animals In Research. . .With Answers From the American Physiological Society*.

The major topic areas include:

Animals in Research (http://www.the-aps.org/pub_affairs/leg_act_cntr/animalissues.htm): This module provides links to legislation and regulations involving animal research. It also has news stories highlighting current issues surrounding the use of animals in science, and a resource list of other organizations that support the humane use of animals in biomedical research.

Biomedical Research Issues (http://www.the-aps.org/pub_affairs/leg_act_cntr/issues.htm): Included on this page are links to FASEB s popular Breakthroughs in Bioscience articles, essays and reports on the benefits of biomedical research, as well as links to major federal government resources such as Congress, the White House and the Library of Congress bill tracking system.

FY 2004 Budget Information: (http://www.the-aps.org/pub_affairs/leg_act_cntr/fy2004.htm): The newly-created budget information page has links to articles and analysis on the FY 2004 budget and appropriations process, with an emphasis on life sciences funding agencies including the NIH, NSF, VA Medical and Prosthetics Research, and NASA s Office of Biological and Physical Research.

Becoming A Research Advocate (http://www.the-aps.org/pub_affairs/leg_act_cntr/become_advocate_biomed.htm): This page is intended to help scientists become more effective advocates for biomedical research. The

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material includes how to write letters and make calls to elected officials, as well how to set up meetings with Members of Congress.

Making Science News

The APS Communications Committee hosted a symposium on Making Science News at Experimental Biology 2003 in San Diego. The program was intended to acquaint scientists with the media and to demonstrate the steps involved in converting a research paper into a news story. The first part of the program featured reporters from newspaper, radio and television discussing the fundamentals of each medium and practical advice on presenting scientific information to journalists. In the second section, APS publicist Donna Krupa led a workshop on how scientists can organize the components of their research into a media-friendly format.

Communications Committee Chair **Andrea Gwosdow** said that the purpose of the session was to coach scientists in media relations because if scientists are able to clearly convey their research to a reporter, this is the first step in ensuring that accurate information goes out to the lay public. She added that learning to explain one s science in an understandable way can be used not only to speak with journalists, but with friends, family and other non-scientific audiences as well.

Gary Robbins, science writer for the *Orange County Register*, Erik Anderson, science reporter at KPBS San Diego, and Barbara Ware, formerly of FOX News in New York comprised the panel of journalists. They gave their insight into what makes science news and the best practices for getting scientific research covered. The panel made the following points:

What Makes News? The speakers agreed on several elements that must be present for information to be considered newsworthy. Since there is a better chance of exposure if the research relates to other breaking or recent news stories, they stressed the importance of timeliness and relevance to current events. Stories that relate to the local community usually take precedence over those with no local connection. Also, stories with a groundbreaking result or that have an immediate effect on health are considered newsworthy.

Media Differences. Though there are many similarities in the definition of newsworthy for the media outlets, there are fundamental differences in how newsworthy information should be presented to each medium. Robbins is an advocate of a relaxed journalist-to-scientist dialogue. Journalists often generalize and focus solely on the bottom line. Robbins finds that scientists best convey the big picture of their research when they converse naturally about what they do instead of talking at length about specific research facts or intricate details of the experiment. Anderson tries to paint a picture with words and sounds in his radio reports, so it is important to be descriptive when explaining science to a radio reporter. Since producers are always concerned with the photo opportunity and television news segments are very short, Ware said that images and brevity are key in television. She cautioned that if there is no visually stimulating aspect, television may be the wrong medium to pursue.

Relationship Building. Developing a relationship with local reporters was another tactic the speakers suggested to increase individual visibility with the media. A first-hand view of science in action makes it easier for a reporter to accurately communicate research to their audience. Therefore, the panel encouraged scientists to invite local reporters to visit their laboratories. They also suggested writing a note to reporters explaining (in simple terms!) personal research focus and areas of expertise, then volunteering to help them understand related scientific concepts or act as an expert on specific topics in the future. Finally, they suggested that scientists respond to an editorial or article and further explain or contribute to the discussion of the article based on their scientific knowledge.

Get to Know Your Local Reporter. The panel recommended becoming familiar with the news outlet to be approached. This might mean reading the newspaper, listening to the newscast, or watching the show of interest. Journalists respond more favorably when scientists have done their homework. For example, through reading the science section of the local newspaper, it is easy to see which writers report on medical news, which ones report on environmental issues and which ones cover research science. Being familiar with the reporter s beat makes it possible to direct information to the right person in the beginning and increases the chances of getting publicity.

Speak Clearly. The panel warned against using scientific jargon. Many people think that science is over their heads, and extensive use of scientific terminology is intimidating. However, the reporters cautioned against underestimating the audience by dumbing-down information. They agreed that a simple, clear presentation is the best way to communicate science to a non-scientific audience. Putting research in context with familiar issues and events is also helpful. (e.g., This finding will have such and such effect on the 17 million Americans living with diabetes today.)

The second part of the symposium was a workshop led by APS publicist Donna Krupa. Krupa summarized what the panelists had highlighted as the fundamentals of each medium and what makes news. She reviewed the various types of reporters and the other persons within news organizations who should receive story leads and press releases. Krupa gave examples of the news coverage that has resulted from the APS media relations program and explained how she uses her knowledge of the media to frame stories in a way that will get the attention of a busy reporter on deadline.

Participants followed her through an exercise in messaging that converted their research into four media-friendly points that could easily be worked into a press release. Finally, she reviewed Interview Do s and Don ts to acquaint participants with what happens on an interview and the best ways to respond to reporters

questions.

Handouts from this symposium are available at http://www.the-aps.org/press/.

NIH Releases Medical School Funding Data

The NIH Office of Extramural Research has released data on the distribution of NIH grant funds in FY 2002. The data provides distribution information by medical school departments and ranks universities by the amount of funding received.

Table 1 represents aggregate data for nine categories of medical school departments. It compares the total number of awards, including research grants, training grants, fellowships, R&D contracts and other awards. It also shows total funding in each category for fiscal year 2002. It should be noted that this year NIH combined certain departments. Departments of physiology are listed together with departments of biophysics, and anatomy and cell biology departments are also combined.

In fiscal year 2002, Departments of Physiology and Biophysics received 1,537 total awards totaling $506,113,318.

According to the latest numbers, Departments of Physiology and Biophysics ranked third out of nine departments in both total number of awards and overall monetary awards.

The complete set of data for these departments can be found on the NIH website. Data for fiscal year 2002 can be accessed at http://grants1.nih.gov/grants/award/trends/medschc.htm. Additional NIH award trend data can be accessed at http://grants1.nih.gov/grants/award/awardtr.htm. ❖

Table 1. Distribution of NIH Grant Funds By Department

Department	Total Number of Awards FY 2002	Total Funding FY 2002
Anatomy/Cell Biology	1,158	$380,708,115
Biochemistry	1,638	515,771,376
Genetics	757	402,328,346
Microbiology/Immunology/ Virology	1,603	512,038,379
Neurosciences	288	107,011,329
Other Basic Sciences	147	33,796,301
Pathology	1,464	498,249,224
Pharmacology	1,438	430,763,663
Physiology/Biophysics	1,537	506,113,318

APS Awards

The APS sponsored awards are plentiful, but in order to be considered, don t forget to submit the application information before the deadline!

Award	*Next Deadline*
William T. Porter Fellowship Award	July 15
Research Career Enhancement Awards	October 15
Teaching Career Enhancement Awards	October 15
Shih-Chun Wang Young Investigator Award	November 1
Arthur C. Guyton Awards in Integrative Physiology	November 1
Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine	November 1
Lazaro J. Mandel Young Investigator Award	November 1
Procter & Gamble Professional Opportunity Awards	November 6
Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Awards	November 6

Letter to Douglas Stuart:

Noboru Toda writes: Thank you for your letter of February 24, inviting me to present my autobiography in *The Physiologist*. I was born in December 1933. My academic career was from 1959 to 1976 in the Department of Pharmacology, Faculty of Medicine, Kyoto University, as an assistant professor and an associate professor, and from 1979 to 1999 in the Department of Pharmacology, Shiga University of Medical Science, as a full professor. Academic activities include the electrophysiological study on sinoatrial pacemaker cells, vascular smooth muscle physiology and pharmacology, autonomic innervation of cerebral vasculature, etc. My life work was the identification of nitrergic innervation in blood vessels. I have been an executive member of the Japanese Pharmacological Society and also of the Japanese Society of Hypertension. I organized Annual Meetings of the Japanese Pharmacological Society, 1998, and also of the Japanese Society of Hypertension, 1994, and the international meeting on the Biology of Nitric Oxide, 1997, in Kyoto. My retirement was March 1999. I have an office in Osaka to continue scientific activities, writing, supervising and teaching. Our recent review article on The Pharmacology of Nitric Oxide in the Peripheral Nervous System of Blood Vessels will be published in June issue of the *Pharmacological Reviews*.

Letters to Michael Barany

Marcelino Cereijido writes: Once I got my MD, PhD in Argentina, I went to Harvard Biophysical Laboratory in 1961 to study, under P.F. Curran and A.K. Solomon, the exchange of substances between higher organisms and the environment that takes place at the level of transporting epithelia. Four years later I opened my own laboratory in Buenos Aires, and in another five years I felt that epithelia were essentially understood, and longed for a more stimulating subject. Was I wrong!

I soon realized that the major question has not even been asked. Transporting epithelia have two fundamental features, tight junctions (TJs) that seal the interspace between cells and transform the epithelium into an effective permeability barrier, and an apico/basolateral polarity that makes vectorial transport possible. Therefore, to me, the major question was why and how do cells establish TJs and polarize? But, according to Karl Popper, a question only becomes scientific when you can do something in the way of answering. Accordingly, we decided to develop a suitable model system.

We isolated epithelial cells from frog skins, and plated them on filter paper, hoping that they would make TJs and polarize. But cells did not even attach, and soon started to die. Yet we knew that virologists grew viruses in cultured cell lines, so my research fellow, C.A. Rabito, went to J. Leighton s laboratory (Pittsburgh, PA) to learn how to culture epithelial lines. Since the key seemed to be the ability of isolated cells to regenerate their membrane and establish cell attachments, my research fellow, E. Zylber, went to Jerusalem to learn about *Dystiostelium*, a unicellular organism that, when the local situation deteriorates, cells attach to each other, and form a slug that travels toward places with better nutrients, more light, or a suitable pH; and my research fellow, E. Rodr guez-Boulan, went to David Sabatini s Department of Cell Biology at New York University to study membrane biogenesis with microsomes. I received a Guggenheim Fellowship (1974) and also went to Sabatini s department. With his coworkers, W.J. Doland and E.S. Robbins, we succeeded in a few months in preparing monolayers of epithelial cells on a Nylon cloth coated with collagen that established TJs and polarized in a few hours under conditions amenable of experimental control. Since our culturing facilities in Buenos Aires were too precarious, my coworker C. Rotunno got another Guggenheim Fellowship and went to NYU (1975) to pursue our project. We were very excited, and gave seminars everywhere, proud of what we were doing, and, of course, we were eager to publish our findings. Unfortunately, Sabatini thought otherwise, and our papers only started to appear four years later a situation that proved to be very shattering.

Due to political upheaval in Argentina, we received letters and phone calls threatening our lives, and we were advised to look for positions abroad. I received several offers but, because we now needed tissue culture facilities, epifluorescence microscopy, transmission and scanning electron microscopes, costly freeze fracture and electronic equipment, my colleagues recommended that we withhold grant applications until we published and documented our findings. Yet Sabatini remained impervious. The situation got far worse in March 1976 when a military junta took power in Argentina, the National Research Council (CONICET) cut off all economic support for research, and with the money so saved bought crucibles to fend off demons from CONACYT headquarters. A colleague of his built a little altar in the premises of the university with exactly the same purpose (it is still there). Our laboratory was disbanded, we were forced into exile, and the team scattered from Mexico to New York and from Boston to Jerusalem. We were the fortunate ones; thousands of fellow countrymen just disappeared. Sabatini remained adamant. Fortunately, my Mexican colleagues invited us to set up a laboratory with everything we needed, including a technician (A. Lazaro) that grew polio viruses in cultured epithelial monolayers! I accepted, but my two children decided to study in the States, and from then on we depended on international travel to visit each other. Eventually, the articles where we described our preparations were published in 1978 in the *Journal of Cell Biology* and later on *Current*

Contents found it to be a Citation Classic. The same year Rabito and Rodriguez-Boulan were to report analogous preparations.

The monolayer of MDCK cells opened entirely new avenues in epithelial research. Our candid expectation to find the molecule that sealed the TJ was met by a flood of information, and today this structure is known to be assembled with not less than 20-odd protein species that shuttle from the membrane to the nucleus, attach to the cytoskeleton, have consensus sequences with transcription factors and tumor suppressors, and undergo a lightening of phosphorylations triggered by cell contacts. Polarity in turn, that we thought exclusive of epithelial cells and neurons, was found in every cell, including single ones like yeast. We studied the polarized expression, addressing signals and sorting machinery of ion channels and the Na+/K+-ATPase, an enzyme that depends on a novel type of cell-cell contact at adherent junctions. We even found a curious relationship of Na+/K+-ATPase (P) with cell attachment (A): its inhibition with ouabain triggers a cascade of phosphorylations that results in retrieval of membrane molecules involved in cell attachment (A), thereby causing a detachment of the cell (P→A mechanism). Since cells can assemble Na+/K+-ATPases with four different isoforms of subunits that differ in their affinity for ouabain, this hormone can decrease the grip between cells in a selective manner through the P→A mechanism. Hence, it is conceivable that P→A may play a role in cell proliferation, in tissue architecture, and favor metastasis.

My saga with cells, people, colleagues, scientific and military dictators left me ruminating about social aspects of science. I became convinced that modern science splits humanity into a First World, with some 10-15% of the population, that creates, produces, sells, owns, defines, decides, and a Third World that travels, dresses, communicates, cures and kills with vehicles, clothes, phones, satellites, medicines and weapons that have been invented in the First and, of course, sinks into mind boggling unemployment, unpayable debts, mushrooming population and misery. On that basis, I classified Latin-Americans as people without science. Offended Argentineans reminded me that two of my dear teachers in Buenos Aires were Nobel Prize winners (B.A. Houssay, 1947 and L.F. Leloir, 1970). Annoyed Mexicans pointed out that Mayas and Aztecs knew the zero, conceived elaborate calendars, and developed chinampas (a culturing procedure with an as yet unsurpassed yield of crops).

I was dreadfully sorry for the blunder, but kept elaborating my point of view, until I convinced myself that the key to this situation was the confusion of science with research. To me Science is firstly and foremost a way of interpreting reality without resorting to dogma, miracles, revelations, nor to the Principle of Authority. Research, instead, depends on the ability to take some portion of the chaos of the unknowns, studying it, and transform and incorporate it into the order of the known. From my point of view, a country like Argentina, whose governments shrug when its universities are destroyed by Nazi-Catholic forces, has a far larger number of scientists abroad than in its own territory, and millions march to beg for employment to the Virgin of Lujan and Saint Cayetano (patron of the workers) does not have a worldview compatible with science. I wrote a book, *People Without Science* with Laura Reinking, analyzing this issue, and expressing the fear that even the First World might be dangerously drifting from the culture of science to the culture of research, thus, risking democratic obscurantism; a moratorium or a downright suppression of free inquiry decided by sheer weight of votes. The manuscript was highly prized by several colleagues and publishers, but was not found to be politically correct.

So, at the moment I continue enthusiastically engaged in research with TJ formation and polarization, and continue trying to make the manuscript of *People Without Science* more palatable to publishers.

Arthur Bachrach writes: In a request, which I consider to be an honor, I have been asked by the Senior Physiologists Committee of the Society to write a brief essay on the occasion of having reached my eightieth birthday. I have always considered the most dangerous instrument in the world to be a rose-colored, binocular retrospectoscope. Looking back is always subject to a certain amount of distortion but, in assessing where I have been and where I am now, there appear several perspectives. I can see that, for me, and I suspect for many scientists, there are three general stages of a career. These are patently not distinct but do overlap: the first stage is that of an experimental, bench researcher;, the second, a stage in which he or she reviews the research of others for grant panels, journals, and the like; and the third, in which he or she develops an interest in the history of the chosen career field. It is in the third stage than I now find myself And it is in this stage that a perspective of the field truly develops. In writing the history of diving underwater biomedical research was my last consuming discipline I have re-read (and, I confess, some for the first time in the original) the giants of the field. Paul Bert and his work on decompression, the Haldanes, PerØ et fils, with myriads of projects, William Harvey s treatise on circulation and, almost without peer, Claude Bernard s *An Introduction to the Study Of Experimental Medicine* (1865) stand out among the works that reflect a skill in observation and perception of incredible power. They all had what Pasteur called the prepared mind, the ability to observe without so focused a vision that any exciting events that occurred, differing from preconceived expectations, would be ignored. It is, perhaps, a cliche to note that many researchers before Alexander Fleming had thrown away cultures ruined by a mold. Fleming did not, but wondered.

As technology develops at an incredible pace, when our powers of observation are enhanced by the marvels of electronics, I believe it is an

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emotional, as well as an intellectual experience to read the scientists upon whose work our own observations grew. I have taped across my word processor two quotations which I would like to share. One is from George Bernard Shaw who wrote, The open mind never acts. Never get so involved in continuing to conduct experiments or searching out the literature that you do not bring a research project to a logical and useful end. The other is a quotation from John Scott Haldane, the son of J.B.S. Haldane, who wrote in the Preface to his book, *Respiration* (1920): Since the time of Hippocrates the growth of scientific medicine has in reality been based on the study of the manner in which what he called the *nature* of the living body expresses itself in response to changes in the environment, and reasserts itself in the face of disturbance and injury. A final note on what I am doing now. In addition to writing and lecturing on diving research and history, my wife and I own a general bookshop in Taos, NM. (There was an ocean here 300 million years ago!). We started the bookshop, Moby Dickens, in 1984, three years before my retirement. I usually am found in the Rare Book room, supporting my bibliophilia and my researches. Who could ask for anything more?

Ata Abdel-Latif writes: Thank you and the Physiological Society for the congratulatory letter on the occasion of my 70th birthday and for the invitation to write an article for *The Physiologist*.

My interest in the sciences started in Ahliyah High School, Ramallah, Palestine. After High School I emigrated to Chicago and started college in 1952. All my education and work until 1967 was in Chicago. First I enrolled at University of Illinois, Navy Pier (a two-year college at that time), then I transferred to Depaul University, where I received a BS degree in Biology-Chemistry in 1955, and MS degree in Organic Chemistry in 1958. In 1959 I enrolled in the PhD program at Illinois Institute of Technology (IIT) where in 1963 I graduated with a PhD in Biochemistry. During that period I worked one year (1955-1956) as a Control Chemist in industry, and one year (1958-1959) as a Chemist in the Department of Cardiovascular Research, Michael Reese Research Institute, under the supervision of Harold Feinberg, a physiologist. Louis N. Katz, a cardiologist, was the head of the Department. This experience outside academia was a big influence in my choice of a career in Basic Medical Research. I do recommend it to our young college students. In 1959, while I was a student at IIT, I received an offer from Spyridon Alivisatos, head of the Department of Biochemical Research, Mount Sinai Research Foundation, to join his research group. I accepted his offer. Alivisatos was interested in the mechanism of action of histamine. We worked on the enzyme NADase (a glycosidase), which removes nicotinamide from NAD and can replace it with histamine (Imidazolysis), to form histamine dinucleotide. Alivisatos and Alan Roush, professor of Biochemistry at IIT, arranged for me to use my work at Mount Sinai for a PhD Thesis at IIT. I learned a lot from professor Alivisatos and his group and I really enjoyed and appreciated this setup. From my Thesis work I published four papers, two in *J. Biol. Chem*., one in *Nature*, and another in *Biochim.Biophys.Acta*.

In February 1963, I joined the laboratory of professor Leo Abood, head of the Neuropsychiatric Institute at University of Illinois school of Medicine, as a Research Associate in Psychiatry. Abood arranged for me to have an appointment at the State of Illinois Pediatric Institute, State of Illinois Department of Mental Health. They paid my salary and generously supported my research program on the Biochemistry of the Developing Brain. In the early 1960s neurochemists developed a novel technique for isolating brain synapses (synaptosomes) and several investigators were studying the effects of neurotransmitters and pharmacological agents on phospholipid metabolism, in particular phosphoinositides, and on protein phosphorylation. I developed a project on the effects of neurotransmitters and pharmacological agents on phospholipid turnover and protein phosphorylation in synaptosomes and other subcellular fractions of the developing rat brain. Leo Abood moved to the University of Rochester in 1965 and I continued my research. In 1965 I received my first NIH-RO1 grant to continue my work on the brain. I continued to renew this grant from NIH (Neurological Diseases and Stroke (1965-1978), and the Eye Institute (1978-June 30, 2004). I was fortunate to have received my postdoctoral training at the University of Illinois. I learned a lot from my mentors and colleagues, Leo Abood, physiolgy-pharmacology, Kyo Koketsu, neurophysiology, and Ryo Tanaka, neurochemistry. This environment at University of Illinois and the city of Chicago with its fine institutions gave me a strong interdisciplinary background in the basic medical sciences. It helped me appreciate the intellectual rewards that come with discovery.

In 1967 I accepted a position as associate professor in the Department of Biochemistry, Medical College of Georgia (MCG), Augusta. By this time our family grew to four children, one girl and three boys I moved my NIH grant with me and continued to work on the brain. In 1968 I became a member of the American Physiological Society. In 1974 I renewed my NIH grant for another three years, and in the same year I was promoted to professor. During that year I met James Matheny from the Department of Pharmacology at MCG; he was working on the pharmacology of the iris smooth muscle of the rabbit eye. Jim, Gerald Carrier and Ray Ahliquest were using the iris as a model in their studies. Jim encouraged me to try the iris in our system. I decided it was time to change tissues. At the outset we found that much lower concentrations of the agonists were required to induce phosphoinositide-and phosphoprotein turnover in the iris than in the brain. At that time the Augusta area had two rabbit slaughter houses in the Augusta area. Keith Green, a physiologist, who was working on the physiology of the iris-ciliary body at John

Hopkins University, joined the Ophthalmology Department at MCG. I had fruitful collaborations with Keith and Jim during those years. The prevailing dogma in the 1950s, 1960s, and 1970s was that addition of various Ca-mobilizing agonists to a wide variety of tissues increases the turnover of the mono phosphoinositide Aphosphatidylinositol (PI)@ and the generation of phosphatidic acid (PA) which is formed from the PI hydrolytic product 1, 2-diacylglycerol (DAG). Our work on the iris showed repeatedly, under physiological conditions, a rapid formation of PA but no corresponding decrease in PI. This suggested to us that there might be another phosphoinositide source for DAG. In September 1975 I started a sabbatical at the Department of Biochemistry, University of Nottingham, England. Professor Tim Hawthorne, the Chairman of the Department, was interested in phospholipases and phosphoinositide metabolism. In October 1975 I performed the same experiment on the rabbit iris, using carbachol as the agonist. However, instead of extracting the phospholipids with the neutral chloroform-methanol, I used, by chance, acidified chloroform-methanol. This acidic solvent happens to extract all the phospholipids, including the polyphosphoinositides (PIP2). Upon analysis of the distribution of 32P-radioactivity in the lipid extract by thin-layer chromatography I found out that only PIP2 lost 32P-radioactivity and later [3H]myo-inositol. This finding showed for the first time that PIP2 is the substrate for muscarinic receptor activation. We reported these findings in 1976 and thereafter, and in 1980 we demonstrated for the first time that the product of PIP2 hydrolysis is IP3 and DAG, measured as PA (For reviews: Abdel-Latif, A.A. *Pharmacological Reviews* 38,227-272, 1986; *Life Sciences* 45, 757-786, 1989). While on sabbatical in England, Rashid Akhtar, now professor of biochemistry and Molecular Biology at MCG, joined our group and our collaboration has continued until the present time. Choosing the right tissue in our investigations played an important role in this discovery. The findings in the 1980s that IP3 is an intracellular calcium mobilizer and that DAG is a protein kinase C activator propelled this field in the forefront of second messenger research. Changing tissues, from brain to iris-ciliary body, resulted in change of institutes at NIH. In 1978 my competitive renewal went to the Eye Institute where it was funded. During this year I also applied for and got another NIH grant from the Eye Institute to work on the Mechanism of the Physiological Release of Arachidonic acid and Prostaglandin Synthesis in the Iris-Ciliary Body. In the 1970s and 1980s the prevailing concept was that in the eye prostaglandins are inflammatory substances, however, this was challenged by many investigators. It became clear to many that prostaglandins, at physiological concentrations, has important physiological functions in the eye (For review, Abdel-Latif, A.A. *Progress in Retinal and Eye Research* 14,75-107, 1995). Prostaglandin F2a and its analogs are now routinely employed by Ophthalmologists to lower intraocular pressure (IOP) in glaucoma patients. In 1987 I was promoted to Regents Professor. During all these years I kept active in the teaching program. Teaching helps an investigator to be more knowledgeable and do better research. Knowledge has an important property: when you give it away, you don t lose it. In the past few years we have been working on the role of various protein kinases in agonist-induced contraction in the iris (For Review, Abdel-Latif, A.A. *Experimental Biology and Medicine* 226,153-163, 2001). This area of research is challenging and very exciting.

On the personal side I have retired in June 2001 and since then I have been working part-time in my laboratory. I am enjoying being semi-retired, no teaching, no committees, no grant applications. This arrangement has allowed me to retire gradually. Both my wife, Iris, and I love to travel. I have been attending regularly the FASEB and EYE Meetings. We see more of our six grandsons, I have more time to read, exercise regularly at the health club, and work in our garden. Augusta, GA, where the Augusta National, home of the Masters Golf tournament, is a place where you can grow flowers and vegetables all year around.

For advice to the young scientist I would say: Work hard, focus on your research and be patient, do your best, read to lead and keep your intellectual curiosity, be alert to the unexpected, do not be afraid to challenge the accepted dogma, build up good relations with your mentors, co-workers and colleagues, and last but not least enjoy your work and have a good time.

Letter to Alan Hoffmann

Francis Morel writes: In response to your question What are you doing now? Are you continuing with scientific or other writing? I must confess that I stopped any personal activity in my field of research since I retired, ten years ago, from my chairman position in cell physiology at the College de France. I maintain, however, recurrent contacts with my former associates in order to be informed of the evolution of their own research projects. As a member of the french Academie des Sciences, I also take part in the activities of this Institution. I nevertheless devote the larger part of my time to practise three hobbies, namely: butterfly collection, which is a pastime I initiated when I was ten years old and continued during nearly all my professional life. In particular, I took advantage of my presence in various congresses in South America, India, Japan or Australia to collect butterflies for a few days in those areas of the world before returning back to my lab after the meeting. In addition to the butterfly collection, I initiated two other hobbies after 1993, since I retired, namely, wood working and creating chess problems.

The way I entered the field of Kidney Physiology may deserve mention here, because it was rather unusual. After having completed my courses in both Medicine and Biological Sciences at the University of Geneva when I was 24, I went to Paris, at the College de France, where

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a research position in the French Atomic Energy Commission (C.E A.) was offered to me in order to develop researches using radioactive isotopes as tracers in biology. At that time (1948), the only radioactive isotopes of biological interest available in France were the short-lived 1281- and 24Na+ prepared in the cyclotron of Joliot-Curie s Lab at College de France. Since Na+ measurement by flame photometry was not yet available at that time, I used 24Na as a tracer in order to analyse Sodium excretion into urine under various experimental conditions in Rats and Rabbits. This is the way I entered the field of Kidney Physiology.

At this point, let me evoke a personal anecdote involving an eminent physiologist. In order to attend the 18th International Congress of Physiology (Copenhagen, 1950), I was supposed to deliver a contribution in the meeting (may I recall that French and Russian, in addition to English, were the official languages at that time). Since a main lecture entiteld The Fate of Sodium Into Urine by Homer Smith was programmed, I decided to present my own data during the discussion. Therefore, I gave my french written slides to the chairman of the session as soon as possible Then, from the huge size of the amphitheater and from the very large audience attending to the lecture, I realized that Homer Smith must have been a well-known leader in Kidney Physiology! I was more and more anxious. A few minutes after starting his lecture, when Homer Smith called for his first slide, my concern increased dramatically, because my own first slide appeared on the screen! When Homer Smith declared, This is not mine, the projectionist (who did not know a single word of English) kept my slide in place, but turned it in the four possible positions successively. The lecture had to be interrupted for a good while because nobody on the platform knew the way to get access to the projection room located behind the amphitheater! You can imagine my stress when, after Homer Smith had finished his lecture, I was called to comment on my slides. I was 27 years old at that time and, of course, I could not imagine that, 29 years later, I would receive the Homer Smith Award of the New-York Heart Association).

In order to reply to the question. As you look back on your life, which of your contributions do you think is most important? , I had first to consider in which sense important should be taken. I decided that a contribution opening new avenues in a given field of research should be called important.

At this point, I have to come back to the kidney. During the 50s and 60s, the analysis of kidney functions moved from the whole organ scale to that of its functional units, the nephrons. As a result of the highly intricated organization of the kidney cortex in mammals, the analysis of the transport and reabsorption properties of each successive tubular portion of the nephrons revealed to be hardly possible in vivo. Therefore, Burg and et al developed a new approach in 1966, the in vitro single single tubule micro perfusion technique in order to investigate those properties under controlled conditions. In this technique, microdissection of the required tubular portions strictly precludes the use of collagenase (otherwise, when perfused in vitro, the tubules dilate and disrupt as a result of the hydrolysis of their peritubular collagen membrane).

Though sophisticated and difficult it might be, this in vitro microperfusion technique was soon adopted by a number of kidney physiologists in various countries, and led to many major contributions to kidney physiology during the 70s and 80s.

In the meantime, however, we developed a highly sensitive in vitro microassay allowing to measure, in one experiment, the hormone-dependant adenylate-cyclase activity in many samples, each containing a single, well-localized nephron portion microdissected from collagenase treated rabbit kidney tissue. We reported this single tubule biochemical microassay in 1975 in *Pfluegers Archives*; in 1995, this paper was selected by the American Society of Nephrology and published again in the Milestone in Nephrology series.

To come back to the question which of your contributions do you think is more important? , I would like to select this technical article because, by establishing that collagenase actually preserves all biochemical and physiological properties of kidney cells, it opened a new, effcient and versatile approach to the in vitro analysis of those properties. ❖

Moving?

If you have moved or changed your phone, fax or Email address, please notify the APS Membership Office at 301-530-7171 or Fax to 301-571-8313. Your membership information can also be changed by visiting the Members Only portion of the APS Website at http://www.the-aps.org.

Postdoctoral Positions

Postdoctoral Positions: Two postdoctoral positions are available in the laboratory of Dr. James Faber, Department of Cell and Molecular Physiology and the Carolina Cardiovascular Biology Center (CCBC), University of North Carolina. Projects seek to elucidate the newly identified direct growth factor action of adrenoceptor stimulation by catecholamines on vascular wall development, remodeling and hypertrophic disease progression, using molecular and cellular analysis of cell culture, organ culture and in vivo models. Current methods and interests include: animal models of vascular disease, remodeling and development (atherosclerosis, restenosis, hypertensive hypertrophy, pulmonary hypertension, flow-mediated remodeling, ischemic and developmental vasculogenesis), regulation of growth, migration, apoptosis and matrix of/by smooth muscle cells and fibroblasts of the vascular wall, gene targeting and array analysis, adrenoceptor expression, and receptor-tyrkinases, intracellular and paracrine signaling. Opportunities exist for collaborative research with investigators in the CCBC and at nearby universities (Duke, NCState, Wake Forest, NCCU) and facilities in the Research Triangle Park (e.g., NIEHS, EPA, Glaxo-SmithKline). Support is through NIH-NHLBI funding. Highly motivated individuals with a PhD or MD and background in vascular research should send a letter explaining research interests and expertise, a curriculum vitae, and reference letters to: James E. Faber, PhD, Professor, Department of Cell and Molecular Physiology, University of North Carolina, Chapel Hill, NC, 27599; jefaber@med.unc.edu. Further information is available at: http://www.med.unc.edu/physiolo/ and http://ccbc.unc.edu/. UNC ascribes to EEOC employment guidelines.

Postdoctoral Position: The University of Tennessee Health Science Center, Department of Physiology, has an NIH-funded position immediately available to study the regulation and physiological functions of local (sparks) and global calcium signaling and ion channels in arterial smooth muscle cells. Required qualifications include a PhD or MD in Physiology or a related field. Experience with patch clamp electrophysiology, confocal microscopy and/or calcium imaging preferred. Send curriculum vitae and names and addresses of three references to Jonathan H. Jaggar PhD, Department of Physiology, University of Tennessee Health Science Center, 894 Union Avenue, Memphis, TN 38163, USA. The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA employer.

Postdoctoral Fellow: St. Louis University, a Catholic, Jesuit institution dedicated to education, research and healthcare, is seeking applicants for the position of Postdoctoral Fellow in the Division of Nephrology. This position is available immediately for a recent PhD graduate to study the biochemistry, cell biology, and physiology of the CLIC family of atypical chloride channels (see *Am. J. Physiol.* 282: C1103, 2002). Candidates with experience in Xenopus oocyte electrophysiology, the fluorescent measurement of intracellular pH, or topologic mapping of integral membrane proteins would be of particular interest. Applications, including curriculum vitae and requests for information can be submitted to: Dr. John C. Edwards, Renal Service, John Cochran VAMC, 915 N. Grand Ave., St. Louis, MO 63106; Email: John.Edwards3@med.va.gov. [AA/EEO]

Postdoctoral Position: A postdoctoral position is available in the Cardiology Section at the Tucson VA Hospital and the University of Arizona Sarver Heart Center. Laboratory investigations are underway in rodent models of heart failure with a primary interest in vascular function in heart failure. The laboratory is presently using an integrated physiological/biochemical approach to experiments in these models. We are looking to expand our program with an individual who has a strong background in molecular biology and an interest in physiology/mechanical engineering. We will provide opportunity for this individual to obtain independent research funding. The laboratory is supported by grants from the VA, the American Heart Association, the NIH, the pharmaceutical industry, and private foundations. Please send resume to Dr. Steven Goldman or Dr. Hoang Thai, Cardiology 111C, Tucson VA, SAVAHCS, 3601 South 6th Ave., Tucson, AZ 85723; Steven.goldman@med.va.gov or Hoang.thai@med.va.gov.

Postdoctoral Fellowship: A postdoctoral fellowship is available at the University of Massachusetts, Amherst. Individuals with a PhD are invited to apply for a position to study the effects of age and sex on human skeletal muscle fatigue. Opportunity to conduct integrative studies using non-invasive techniques, with the purpose of determining the in vivo mechanisms of fatigue. Dynamic environment in which to examine how muscle activation, energy metabolism, contractile function and perfusion may be altered by age or sex. A strong background in muscle physiology is desirable. Experience with magnetic resonance spectroscopy or imaging beneficial, but not necessary. This is a five-year project funded by the National Institute on Aging. Approximate start date: August 2003. Inquiries or applications: Jane Kent-Braun, PhD, Department of Exercise Science, Totman 108, University of Massachusetts, Amherst MA 01003; janekb@excsci.umass.edu. Application should include letter of interest, CV and contact information for three academic references.

Postdoctoral Position: An NIH-funded postdoctoral position is available immediately at the Children s Hospital of Philadelphia to study the mechanism of glutamate dehydrogenase allosteric regulation, insulin sig-

naling and ammonia flux in transgenic mouse model of Hyper-insulinism/Hyperammonemia Syndrome targeting liver specific Glutamate Dehydrogenase gene expression in transgenic mice. Candidates with PhD degree in biological science are encouraged to apply for this position. Ref: *J Clin Endocrinol Metab* 86: 1782-1787, 2001. *Biochem J* 363: 81-87, 2002; *J. Biol. Chem*. 278:2853-2858, 2003. Send curriculum vitae and names, addresses, phone numbers, Email addresses of three references to: Charles A. Stanley, MD, Chief, Division of Endocrinology/Diabetes, Children s Hospital of Philadelphia; email address: stanleyc@email.chop.edu.

Postdoctoral Scientist: The Vanderbilt University Institute of Imaging Science (VUIIS; http://vuiis.vanderbilt.edu) is seeking qualified applicants for a two-year postdoctoral position in imaging of exercising skeletal muscle. The position is in the Metabolic Imaging program, headed by Bruce Damon, PhD. Possible research programs involve metabolic imaging of exercising muscle using perfusion imaging and MR spectroscopic imaging, understanding the physiological and biophysical basis of muscle functional MRI, study of muscle structure-function relationships using diffusion tensor MRI fiber tracking, spatial tagging, and muscle functional MRI. Qualifications include doctorate awarded before 1/1/2004 with an emphasis in Neuromuscular Physiology, Biochemistry, or Mechanics. Research experience using electromyography, MRI, and/or MRS is preferred. Outstanding instrumental resources, including a 3.0T GE whole-body MR imager, 4.7, 7.0, and 9.4 T Varian animal MR imagers, microCT, microPET, surface electromyography, and near-infrared spectroscopy systems, are or will soon be available at VUIIS. In addition, VUIIS possesses outstanding personnel resources and extensive electronics and computing facilities. Equipment is available or can be built to support a variety of exercise modes. Interested persons should send three letters of reference, vita, and a statement of research interests to: Bruce Damon, PhD, Department of Radiology and Radiological Sciences, Vanderbilt University Medical Center, 1161 21st Ave S, CCC-1121 MCN, Nashville, TN 37232; Email: bruce.damon@vanderbilt.edu; Tel: 615-322-8355; Fax: 615-322-0734. Complete applications received prior to July 1, 2003 will receive first priority, but all applications will be fully considered until the position has been filled. All qualified persons are encouraged to apply. [EEO/AA]

Teaching Positions

Assistant/Associate Professor: Tenure-track Instructor/Assistant/Associate Professor of Biology to teach two-term upper-level mammalian A&P sequence and two-term upper-level research sequence; advise pre-medical students, starting fall 2003 at Wartburg College. Requires ABD in appropriate scientific area and demonstrated expertise in physiology. For details see our web site http://www.wartburg.edu/hr. Wartburg College in Waverly, IA is an accredited four-year, coeducational liberal arts college of the Lutheran Church (ELCA). [AA/EOE]

Assistant/Associate Professor of Wildlife Toxicology: The Institute of Arctic Biology and Department of Biology and Wildlife at the University of Alaska Fairbanks seek a toxicologist using cellular and molecular approaches to study wild populations of vertebrates. This tenure-track position is supported by an NIH-sponsored grant that provides access to core equipment, travel, student support, and seed funds. The successful candidate will be expected to develop an externally funded research program and to be effective in teaching two courses per year and training graduate students in areas such as wildlife disease, cell biology, immunology or ecotoxicology. The University of Alaska is establishing a program in molecular toxicology as part of its BRIN (Biomedical Research Infrastructure Network; http://www.alaska.edu/brin/) program supported through a grant from the National Center for Research Resources (NIH). Five faculty positions are funded: two are in Anchorage and three are in Fairbanks. A sixth faculty member will be part of a new Bioinformatics Program that includes four total faculty and associations with the Arctic Region Supercomputing Center (http://www.arsc.edu/) and the Institute of Systems Biology (http://www.systemsbiology.org/). Applications must include a signed applicant form (http://www.alaska.edu/hr/forms/hr_employmentforms.xml), curriculum vitae, statements of teaching philosophy and research interests, representative reprints, and at least three letters of recommendation. Send applications to Wildlife Toxicology Search, PCN# 248016 REQ#FF248016 01, UAF Human Resources, PO Box 757860, University of Alaska Fairbanks, Fairbanks, AK 99775-7860; Fax: 907-474-5859; Email: fyjobs@uaf.edu. Positions will remain open until filled. Further information about the University and the position is available at: http://mercury.bio.uaf.edu/ or from Dr. Perry S. Barboza (ffpsb@uaf.edu) or Dr. R. Terry Bowyer (ffrtb@uaf.edu). [AA/EEO]

Faculty Position: Chapman University is seeking applications for a faculty position in the Department of Physical Therapy. Requirements for the position include relevant PhD with expertise in one or more of the following areas: systems physiology, neurophysiology or cardiopulmonary physiology. In addition, we are seeking someone with a distinguished record of research, publication, and extramural funding. Successful applicants will have demonstrated excellence in teaching and commitment to cultural diversity. Chapman, an independent, comprehensive university, is located in Orange County in a culturally diverse community with major medical facilities and research institutions. *US*

News and World Report has ranked the academic quality of Chapman in the upper quartile of all four-year colleges and universities in the Western US. Submit cover letter, vita, evidence of qualifications, and a list of five references with addresses, telephone numbers and email addresses to: Don Gabard, PT, PhD, Search Committee Chair, Department of Physical Therapy, Chapman University, Orange, CA 92866; Email: gabard@chapman.edu. Application review begins immediately and continues until the position is filled. Chapman University is committed to providing equal career opportunities to all individuals.

Research Positions

Research Scientist and Research Engineer Positions at National Center of Excellence: The Center for Modeling Integrated Metabolic Systems (MIMS) at Case Western Reserve University has two positions available: research scientist and research engineer. The center is NIH-funded and focuses on developing and validating computational models of metabolism in heart, brain, liver, skeletal muscle, and the whole body. We are seeking two individuals to work together in conducting research in systems physiology and mathematical modeling at the whole-body level. Research scientist will be involved in the design and implementation of animal and human protocols to investigate acute and chronic whole-body responses to exercise and hypoxia to provide data for the development and validation of computational models of metabolism and cardio-respiratory control from the MIMS Center. Requirements for research scientist position are three years experience conducting biomedical research and a PhD in Physiology, Systems Biology, or Biomedical Engineering. Research engineer will *1*) coordinate the development of computational models of heart, brain, liver, and muscle metabolism; and *2*) develop computational models of whole body metabolism to predict responses to dietary manipulation, hypoxia, and exercise. Requirements for research engineer position are 1-3 years experience in modeling biomedical systems and a MS in biomedical, systems, or computer engineering. For additional information about the MIMS center visit website at http://www.csuohio.edu/mims/. Contact Information: Marco E. Cabrera, PhD, Case Western Reserve University, 11100 Euclid Avenue, RBC-389, Cleveland, OH 44106; Tel: 216-844-5085; Fax: 216-844-5478; Email: mec6@po.cwru.edu.

Graduate Training Opportunities in the Cardiovascular Sciences: Michael E. DeBakey Institute for Comparative Cardiovascular Science and Biomedical Devices, Texas A&M University announces the inauguration of the DeBakey Scholars Program for studies leading to the PhD in Comparative Physiology and Pharmacology. This program provides unique opportunities to train with interdisciplinary research faculty with expertise in the cardiac and vascular sciences, from molecular/cellular to organ/animal levels, with a common focus on cardiovascular pathophysiology. Scholarships are available for predoctoral students with a background in the life sciences or biomedical engineering, PhD/DVM candidates, and individuals with MD or DVM degrees seeking advanced training in cardiovascular research. DeBakey Scholars will receive a competitive stipend (18K+/year) and health benefits. For more information visit http://debakeyinstitute.tamu.edu or contact glaine@tamu.edu. ❖

Development of the Human Spinal Cord: An Interpretation Based on Experimental Studies in Animals

Joseph Altman and Shirley A. Bayer, NY
542 pp., illus., index, $185.00

I quickly agreed to review this book *Development of the Human Spinal Cord* in thinking, by not paying attention to the subtitle *An Interpretation Based on Experimental Studies in Animals*; how much could there be except for lots of nice pictures? Well, I was quite surprised when this full-sized 500+ page book arrived, and, yes, the book is characterized throughout with numerous excellent photographs. But in addition, it also contains many clear and informative illustrations, diagrams and tables as well as a straightforward accompanying text, and, really, none of this should be surprising considering the previous fine work of the authors Joseph Altman and Shirley A. Bayer.

The opening chapter provides an overview of spinal cord organization with emphasis on dorsal horn laminar organization, afferent inputs, motoneurons of the ventral horn with its division into a 3x4 grid of sectors, and fiber tracts of the white matter. This chapter serves as an excellent review of basic information most neuroanatomists know (or should know but may have forgotten) and, thus, sets up much of the rest of the book. The second chapter focuses on the evolutionary phylogeny of the spinal cord, with emphasis on paleospinal and neospinal systems. It also presents interesting hypotheses on the variable size and spinal length of the corticospinal tract across species as well as the translocation this tract from its dorsal funicular position in many animals to its lateral funicular position in carnivores and primates. Chapter two also presents an interesting description of the slabs of the substantia gelatinosa and their possible correspondence to the barrels of the cerebral cortex and the barreloids of the thalamus and trigeminal nucleus.

Chapter three describes the technique of thymidine autoradiography and demonstrates use of this method with an extensive description of the maturation of neurons in the ventral horn, intermediate gray and dorsal horn. Here we find the authors proposed tripartite division of the developing neural tube (dorsal, intermediate and ventral plates) in comparison to the classical bipartite division into alar and basal plates as described by His. Chapter four opens with a description of the growth and development of the dorsal root ganglion, continues with development of ascending fibers in the dorsal funiculus and growth of descending fibers, and finishes with myelination. Additional topics in this chapter include brief descriptions of the roof and floor plates including an interesting hypothesis of the role of these structures in the morphogenesis of the H shape of the spinal cord gray matter.

The second half of this book, chapters five to nine, covers human spinal cord development and is based primarily on specimens from three collections in the National Museum of Health and Medicine (currently housed at the Armed Forces Institute of Pathology, Washington, DC), the Carnegie Collection, the Yakolev collection and the apparently not previously described Minot collection. Chapter five covers the first trimester (gestational weeks 3.5 to 13) and chapter six the second and third trimesters (gestational weeks 14 to 44). While these chapters can be rather tedious to read as they trace development on a week to week basis at rostral to caudal levels, the detailed descriptions provided would be invaluable to those seeking precise information. Tabular summary in chapter five of first trimester weekly events in relation to three developmental epochs (neuroepithelium production, neurogenesis and gliogenesis) is especially helpful. Chapter six essentially details the two major events of trimesters two and three expansion of the white matter and its progressive myelination. It also includes details on the development of Clarke s column and ventral horn motoneurons.

Chapter seven describes the prenatal growth of the corticospinal tract, and chapter eight describes its protracted myelination during the first two years of postnatal life. Both of these chapters present clear summary figures and informative tables. In chapter seven we learn of striking variations in the lateral and ventral funicular components of this tract in different specimens, and chapter eight describes the logical rostral-to-caudal corticospinal tract growth and myelination in comparison to the opposite caudal-to-rostral sequence of ascending fibers in the dorsal funiculus. Chapter nine presents some unique and challenging correlations between spinal cord and behavior development at pre- and postnatal ages, including comparisons with corticospinal tract myelination into childhood. This chapter includes supportive evidence for controversial descriptions of corticospinal tract somatotopy.

In summary, I confess embarrassment by my initial feelings on first receiving what I anticipated would be a dense, arcane book with limited appeal. However, after reading just a few pages I found out I was wrong; the text is well-matched to the striking clarity of the photographs. This book provides a rich source of information to those interested in the spinal cord as it relates to their teaching activities as well as to those engaged in spinal cord research. I have already recommended it to both types of colleagues. ❖

Anthony J. Castro
Loyola University Chicago

Cells, Gels and the Engines of Life

Response to Miller s review

Chris Miller s review (*The Physiologist*, 45 (6), 2002) of my book, *Cells, Gels, and the Engines of Life* makes for snappy reading, but it misses the point.

The book is not about channels, pumps, and membranes, as one might surmise from the review. It is about the gel-like nature of the cell. Scientists recognize that the cell is a gel. Even housewives and children know it; anyone who has cracked open a raw egg immediately recognizes the cytoplasm s gel-like consistency. Cell-biology books commonly open with this fact and then blithely go on to present mechanisms based not on a gel foundation, but on aqueous solution foundation with free solute diffusion. Could something be awry?

Miller evades the issue. All that follows from the cell s gel-like consistency is dismissed as nonsense with no offer of even a single reason why. It s guilt by decree. Miller opts out by stating that it is not my purpose to critique the theory itself but why not? After all, that s basically what the book is about. While Miller grants himself license to decree, a dozen other reviewers have lavished the book with a level of praise practically unheard of for a theory as unconventional as this one. Don Ingber of Harvard, for example, states (*Cell*, 109: 688-689, 2002), that the book is a 305-page preface to the future of cell biology. Like Miller, Ingber and other reviewers comment on the lively text, the great illustrations, etc. which explains why the book just took the top award from the Society for Technical Communication, and why one reviewer (*Pharm. Res.* 18:1804-1805, 2002) claimed the book was as interesting as any on the *New York Times* best seller list. The material seemed profound enough to the Biomedical Engineering Society that they bestowed upon its author this year s Distinguished Lecture Award, their top honor. All of these accolades notwithstanding, Miller dismisses the book with a wave of the hand.

Instead of critiquing the central message, Miller goes on to nit-pick on peripheral minutiae. He picks three nits. The first is that I made a point along the way by citing material in a monograph. Guilty as charged. Monographs are not (necessarily) peer-reviewed. How much peer-review went into the book I quoted is unclear, but if my own book is taken as a representative example, pre-publication critical review was provided by no fewer than 50 seasoned or budding scientists. Next, Miller critiques an example I offered: the wooly bear caterpillar, which survives arctic temperatures with impunity. The claim is that an extremophile was used to draw a general conclusion. Not true. I point out that numerous plants and cold-blooded animals need to cope with sub-freezing temperatures on a regular basis without crystallizing into ice. Once frozen, ice crystals rip mercilessly through the cellular framework and wreak havoc in the same way that a pond that freezes over can crack the enclosing concrete shell. Finally, Miller criticizes my concern over the enormous amount of energy required to power the 100+ pumps in the cell membrane (an issue never seriously addressed by the field). His criticism centers on the point that drug-resistant transporters can now be seen with atomic resolution. Indeed they can. But how does that argue for or against the question of whether the cell has enough energy to power all of these putative pumps?

On the basis of this triple barrage, Miller concludes that the author is obviously trying to pull the wool over the eyes of the na ve reader. He attacks my approach of writing for the uninitiated rather than for the experts, forgetting Max Planck s admonition that the purveyors of conventional wisdom will die before they are willing to seriously entertain a challenge to their long-held views. I am not na ve enough to expect that many of those building their careers on ion-selective channels will look seriously on a book that lays challenge to some of their most closely held views, no matter how sound the challenge might be. Certainly not! It is the young, open-minded scientists, far removed from well-defended turf, who will ultimately judge whether the conventional view is sound or whether alternative views might explain the same data more consistently and more simply. It is they who will determine the future.

As I travel frequently around the world to deliver invited lectures on this material, I note two issues that consistently set the audience abuzz. Although considered in the book, and central to the integrity of currently held views, Miller offers no comment even though these challenges fall within his domain. Consider the following:

Patch clamp experiments. The Neher/Sackmann experiments on isolated pieces of membrane show a series of constant-amplitude current pulses, interpreted as a reflection of channel openings. However, when the membrane patch is replaced by silicon rubber, the same current pulses appear (*1*). And, when the membrane patch is replaced by a polymer filter, the same current pulses appear (*2*). And, when the membrane patch is replaced by a pure lipid bilayer that has never seen a protein, the same current pulses appear (*3*). To many observers, these observations lend a serious note of doubt. Miller lets them slide without comment. Why?

Membrane continuity. A central feature of current thinking is the critical importance of cell-membrane integrity: breach the membrane and the cell dies. Yet, the book cites half a dozen generic examples in which the integrity of the membrane is violated the cell is even sliced in two and the cell continues to do just fine. In several of these situations, evidence shows that the membrane could not have resealed. These observations should not be misconstrued as suggesting the membrane is irrelevant, but they do show that the integrity of the membrane is less significant than surmised. With open membranes through which ions can freely pass, could pumps and channels be as critical for life as we make them out to be? Why does Miller let all of this slide without comment? If there are simple

answers to these provocative questions, why does Miller not tell us what they might be?

If the cell is a gel, then it should be treated as such. Virtually all current mechanisms build on the notion that the cell is an aqueous solution. Gels are different from aqueous solutions, and from this vantage point, it would seem that treating the beast for what it is rather than what it is not will get us further. That s what the book does, although one would not know it from Miller s review.

All of this is a pity because the mechanisms that emerge from this approach are simpler than those currently envisioned, and at least as consistent with available data. Whether they are really a preface to the future of cell biology remains to be seen, but they certainly offer a systematic alternative. Miller, on the other hand, feels that paradigm-shifting alternatives have little place in science. He quips that the works of Kuhn and Popper ought to be banned from the children s section of library so that youngsters don t get the misimpression that major paradigm shifts are still possible in science.

The great physician/scientist Claude Bernard taught us that controversy is the lifeblood of science. Miller thinks we should be more deferential to current thinking, and I wonder whether this might be achieved by all of us doing a stint as children s librarian?

Gerald H. Pollack
University of Washington

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3. Woodbury et al., *J. Memb. Biol.* 109(2): 145-150, 1989.

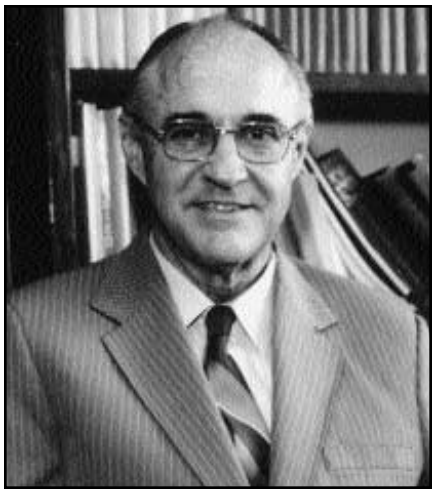
The Physiologist
Vol. 46, No. 3, 2003

In Memoriam
Arthur C. Guyton
(1919-2003)

The sudden loss of **Arthur C. Guyton** in an automobile accident on April 3, 2003, and the loss of his devoted and remarkable wife Ruth Weigle Guyton one week later as a result of injuries from the accident, stunned and saddened all who were privileged to know them. Arthur Guyton was a giant in the fields of physiology and medicine, a leader among leaders, a master teacher, and an inspiring role model for people throughout the world.

Arthur Clifton Guyton was born in Oxford, MS to William (Billy) S. Guyton, an eye, ear, nose and throat specialist and Dean of the University of Mississippi Medical School, and Kate Smallwood Guyton, a math and physics teacher who had been a missionary in China before their marriage. During his formative years, Arthur enjoyed watching his father work at the Guyton Clinic, playing chess and swapping stories with William Faulkner, and building sailboats (one of which he later sold to Faulkner) and countless mechanical and electrical devices, which he continued to do throughout his life. His brilliance shone early as he graduated top in his class at the University of Mississippi, distinguished himself at Harvard Medical School, and began his postgraduate surgical training at Massachusetts General Hospital.

His medical training was interrupted twice once to serve in the Navy during World War II and again in 1946 when he was stricken with poliomyelitis during his final year of residency training. Suffering paralysis in his right leg, left arm, and both shoulders, he spent nine months in Warm Springs, GA, recuperating and applying his inventive mind to building the first motorized wheelchair controlled by a joy stick, motorized hoists for lifting patients, special leg braces and other devices to aid the handicapped. For those inventions he received a



Arthur C. Guyton

Presidential Citation. He returned to Oxford where he devoted himself to teaching and research at the University of Mississippi School of Medicine and was named Chair of the Department of Physiology in 1948. In 1951 he was named one of the 10 outstanding men in the nation. When the University of Mississippi moved its Medical School to Jackson in 1955, he rapidly developed one of the world s premier cardiovascular research programs. His remarkable life as a scientist, author, and devoted father is detailed in a biography published on the occasion of his retirement in 1989 (*1*).

A Great Physiologist. Arthur Guyton s research contributions, which include more than 600 papers and 40 books, are legendary and place him among the greatest figures in the history of cardiovascular physiology. His research covered virtually all areas of cardiovascular regulation and led to many seminal concepts that are now an integral part of our understanding of cardiovascular disorders such as hypertension, heart failure, and edema. It is difficult to discuss cardiovascular regulation without including his concepts of cardiac output and venous return, negative interstitial fluid pressure and regulation of tissue fluid volume and edema, regulation of tissue blood flow and whole body blood flow autoregulation, renal-pressure natriuresis, and long-term blood pressure regulation.

Perhaps his most important scientific contribution, however, was a unique quantitative approach to cardiovascular regulation through the application of principles of engineering and systems analysis. He had an extremely analytical mind and an uncanny ability to integrate bits and pieces of information, not only from his own research but also from others, into a quantitative conceptual framework. He built analog computers and pioneered the application of large-scale systems analyses to modeling the cardiovascular system before digital computers were available. With the advent of digital computers, his cardiovascular models expanded dramatically in the 1960 s and 70 s to include the kidneys and body fluids, hormones, autonomic nervous system, as well as cardiac and circulatory functions (*2, 3*). He provided the first comprehensive systems analysis of blood pressure regulation and used this same quantitative approach in all areas of his research, leading to new insights that are now part of the everyday vocabulary of cardiovascular researchers.

Many of his concepts were revolutionary and were initially met with skepticism, and even ridicule, when they were first presented. When he first presented his mathematical model of cardiovascular function at the Council for High Blood Pressure Research meeting in 1968, the responses of some of the hypertension experts, recorded at the end of the article (*2*), reflected a tone of disbelief and even sarcasm. Guyton s systems analysis had predicted a dominant

role for the renal pressure natriuresis mechanism in long-term blood pressure regulation, a concept that seemed heretical to most investigators at that time. One of the leading figures in hypertension research commented I realize that it is an impertinence to question a computer and systems analysis, but the answers they have given to Guyton seem authoritarian and revolutionary. Guyton s concepts were authoritarian and revolutionary, but after 35 years of experimental studies by investigators around the world, they have also proved to be very powerful in explaining diverse physiological and clinical observations. His far-reaching concepts will continue to be the foundation for generations of cardiovascular physiologists.

Guyton received more than 80 major honors from diverse scientific and civic organizations, and universities throughout the world. A few of these that are especially relevant to cardiovascular research include the Wiggers Award of the American Physiological Society, the Ciba Award from the Council for High Blood Pressure Research, The William Harvey Award from the American Society of Hypertension, the Research Achievement Award of the American Heart Association, and the Merck Sharp & Dohme Award of the International Society of Hypertension. It was appropriate that in 1978 he was invited by the Royal College of Physicians in London to deliver a special lecture honoring the 400th anniversary of the birth of William Harvey who discovered the circulation of the blood.

Although honored by many professional organizations, Guyton s scientific home was the American Physiological Society (APS). He became a member of APS in 1949 and continued as a regular dues-paying member until his death. He served as president of the APS and the Federation of American Societies of Experimental Biology from 1974-75. He also served as Councillor, Chair of the Education Committee, Chair of the Finance Committee, and a member of the editorial boards of APS journals. In 1981, he received the Ray G. Daggs Award for his outstanding service to the Society.

His love of physiology was beautifully articulated in his president s address to the APS in 1975 (*4*), appropriately entitled Physiology: a Beauty and a Philosophy. Let us quote just one sentence from his address: What other person, whether he be a theologian, a jurist, a doctor of medicine, a physicist, or whatever, knows more than you, a physiologist, about life? For physiology is indeed an explanation of life. What other subject matter is more fascinating, more exciting, more beautiful than the subject of life.

A Master Teacher. Although Guyton s research accomplishments are legendary, his contributions as an educator have probably had an even greater impact on the world. The fact that he and Ruth raised 10 remarkable children who all became outstanding physicians is a great educational achievement in itself. Eight of the Guyton children graduated from Harvard Medical School, one from Duke Medical School, and one from The University of Miami Medical School after receiving a PhD from Harvard. An article published in *Readers Digest* in 1982 highlighted their extraordinary family life (*5*).

The success of the Guyton children did not occur by chance. Guyton s philosophy of education was to learn by doing. The children, therefore, participated in countless family projects that included the design and construction of their home and heating system, swimming pool, tennis court, sailboats, homemade go-carts and electrical cars, gadgets for their home, and electronic instruments for their Oxford Instruments Company. Television programs such as Good Morning America and 20/20 described the remarkable home environment that Arthur and Ruth Guyton created to raise their family. They are a wonderful family, sharing the values of hard work and dedication, teamwork, the excitement of learning and discovery, and a deep love for each other. His devotion to family is beautifully expressed in his *Textbook of Medical Physiology* (*6*) that is dedicated: To: My Father for His Uncompromising Principles That Guided My Life; My Mother for Leading Her Children Into Intellectual Pursuits; My Wife for Her Magnificent Devotion to Her Family; My Children for Making Everything Worthwhile.

Guyton was a master teacher at the University of Mississippi for over 50 years. Even though he was always busy with service responsibilities, research, writing, and teaching, he was never too busy to talk about a new research idea, a new experiment, or to talk with a student who was having difficulty. He would never accept an invitation to give a prestigious lecture if it conflicted with his teaching schedule.

His contributions to education are also far reaching through generations of graduate students and postdoctoral fellows. He trained over 150 scientists, at least 29 who became chairs of their own departments, and six who became presidents of the APS. He gave students confidence in their abilities and emphasized his belief that, People who are really successful in the research world are self-taught because they are teaching themselves beyond where other people are. He insisted that his trainees integrate their experimental findings into a broad conceptual framework that included other interacting systems. This usually led to our attempts to develop a quantitative analysis and to a better understanding of the particular physiological systems that we were studying.

No one has been more prolific in training leaders of physiology than Arthur Guyton. In 2001, he received the Eugene Braunwald Academic Mentorship Award by the American Heart Association.

Guyton s famous *Textbook of Medical Physiology* attracted many of his trainees to Mississippi. His book was a masterpiece, presenting the key concepts in a clear and interesting manner that made studying physiology fun. He wrote this book to teach his students, not to impress his professional colleagues, and its popularity with students has made it the most widely used physiology textbook in

(continued on page 128)

(continued from page 127)
history. This accomplishment alone was enough to ensure his legacy.

Through his *Textbook of Medical Physiology*, which is translated in at least 15 languages, he has probably done more to teach physiology to the world than any other individual in history. Unlike most major textbooks which often have as many as 10-20 authors, the first eight editions of the *Textbook of Medical Physiology* were written entirely by Guyton with a new edition always arriving on schedule for nearly 40 years. This feat is unprecedented for any physiology or medical text. His textbook is unique in the history of medical publishing. For his many contributions to medical education, Guyton received the 1996 Abraham Flexner Award from the Association of American Medical Colleges. He is also honored each year by APS through the Arthur C. Guyton Teaching Award.

An Inspiring Role Model. Guyton s accomplishments extended far beyond science, medicine, and education. He was an inspiring role model for life as well as for science. No one was more inspirational or influential on our scientific careers than Guyton. He taught us much more than physiology he taught us life, not so much by what he said but by his unspoken courage and dedication to the highest standards.

He had a special ability to inspire people through his indomitable spirit. Although he was severely crippled with polio, those of us who worked with Arthur Guyton thought of him as being handicapped. His brilliant mind, his indefatigable devotion to science, education, and family, and his spirit captivated students and trainees, professional colleagues, politicians, business leaders, and virtually everyone who knew him.

His courage in the face of adversity humbled us. He would not succumb to the crippling effects of polio. It is very unlikely that a repairman ever crossed his doorstep, except perhaps for a social visit. He and his children not only built their home, but also repaired each and every malfunctioning appliance and home device no matter the difficulty or the physical challenge. He built a hoist to lower himself into the hole beneath their house to repair the furnace and septic lines when calling a repairman seemed to be the only option to those who did not know him well. On trips to meetings, he walked long distances across airport terminals when using a wheelchair would have been much easier. His struggle to rise from his chair and walk to the podium for a lecture was moving, but the audience was always more impressed when he forcefully articulated his brilliant concepts. His courage challenged and inspired us. He expected the best, and somehow brought out the very best in people. Seeing his indomitable spirit and the challenges that he overcame, how could his trainees not do their best?

We celebrate the magnificent life of Arthur Guyton, recognizing that we owe him an enormous debt. He gave us an imaginative and innovative approach to research and many new scientific concepts of cardiovascular regulation, he gave countless students throughout the world a means of understanding physiology, he gave many of us exciting research careers and, most of all, he inspired us with his devotion to education, his unique ability to bring out the best in those around him, his warm and generous spirit, and his courage. We will miss him tremendously, but he will remain in our memories as a shining example of the very best in human kind. Dr. Arthur Guyton was a real hero to the world, and his legacy is everlasting. ❖

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John E. Hall,
University of Mississippi

Allen W. Cowley Jr.
Medical College of Wisconsin

Vernon S. Bishop
University of Texas

D. Neil Granger
Louisiana State University

L. Gabriel Navar
Tulane University

Aubrey E. Taylor
University of South Alabama

Physiology in Perspective
Walter B. Cannon Memorial Lecture Award

The Cannon Memorial Lecture honors Walter B. Cannon, President of the Society from 1913-1916, and is presented annually by a distinguished physiologic scientist at the spring meeting. The lecture, sponsored by the Grass Foundation, is selected by the APS President with the consent of Council.

More information on the award and nomination procedures are available at http://www.the-aps.org. Nominations must be submitted by **October 1.**

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Vol. 46, No. 3, 2003

Haddy Receives Mayo Clinic Distinguished Alumni Award

Mayo Clinic honored three physicians for their contributions to medicine, research and education.

Francis J. Haddy, Gertrude M. Tyce, and Jack P. Whisnant, were presented Mayo Foundation Distinguished Alumnus Awards on Saturday, May 17, 2003, during commencement ceremonies for the Mayo Medical School and Mayo Graduate School in Rochester, MN. The awards recognize alumni of Mayo Clinic education programs who have achieved significant national and international distinction in their fields.

Haddy was honored for his contributions to physiology and medicine.

Haddy earned his medical degree from the University of Minnesota and later completed a fellowship in internal medicine at Mayo Clinic. He went on to earn his PhD in physiology from the University of Minnesota Medical School.

He has published over 150 papers in peer-reviewed journals. Haddy has also published 112 reviews and 367 abstracts. These publications concerned cardiovascular physiology and cardiovascular disease, particularly the roles of sodium, potassium, and digitalis-like substances in low renin hypertension. He taught 45 classes of medical students and chaired three departments of physiology (University of Oklahoma, Michigan State University, Uniformed Services University). He has been on the editorial boards of a number of journals, including the *American Journal of Physiology*, *Circulation Research*, *Hypertension* and the *Journal of the American College of Nutrition*.

Francis J. Haddy

Haddy has served on advisory committees and as a member of the boards of trustees for the National Hypertension Association, American College of Nutrition, American Association for Accreditation of Laboratory Animal Care (AAALAC), and Federation of American Societies for Experimental Biology (FASEB). He has made Liaison Committee on Medical Education (LCME) site visits, including one to the Mayo Medical School. He is a past president of the American Physiological Society. Haddy administered the grant application peer review program in the cardiopulmonary, integrated physiology, and clinical areas for the National Aeronautics and Space Administration (NASA) and currently serves as a consultant to NASA Life Sciences. ❖

Rickles Named FASEB Executive Director

Frederick Rickles has been selected as the new executive director of the Federation of American Societies for Experimental Biology (FASEB). Robert Wells, FASEB president-elect and chair of the executive director search committee, describes Rickles as an outstanding leader who brings a rich background of administrative, clinical and research accomplishments to his new duties.

Rickles currently serves as associate vice president for health research, compliance and technology transfer at the George Washington University medical center. From 1993-1998 he was the deputy chief of hematologic diseases at the Centers for Disease Control and Prevention as well as professor of medicine and pediatrics at Emory University in Atlanta.

In addition, Rickles is a former director of the Thrombosis Research Laboratory at Walter Reed Army Institute of Research. His research interests are in the area of hematology; specifically in blood clotting, inflammation and tumor biology.

Frederick Rickles

A member of the American Society of Hematology, the American Heart Association and the American Association of Immunologists, Rickles has served on several study sections at the National Institutes of Health and the Department of Defense, as well as the American Cancer Society and the American Heart Association.

In announcing the selection, Wells, who also is Director of the Center for Genome Research at the Institute of Biosciences and Technology at Texas A&M University System Health Science Center, acknowledged the contributions of retiring executive director Sidney Golub. I also wish to take this opportunity to express my gratitude to Dr. Golub for his dedicated service as the executive director over the past three-year period. Sid has played an important role in the Federation s recent growth and progress. ❖

APS Members Elected to the American Academy of Arts and Sciences

The American Academy of Arts and Sciences announced the election of 187 new fellows and 29 foreign honorary members for 2003. Among those elected are six APS members: **Peter Agre, Dennis Ausiello, Barry Brenner, Jerome Posner, Rae Silver, and Samuel Silverstein**

Agre is a professor at the Johns Hopkins University School of Medicine.

Ausiello is the Chief of Medical Services at the Massachusetts General Hospital.

Brenner is the Samuel Levine professor of Medicine/Director Emeritus at the Brigham & Women s Hospital, Boston, MA.

Posner is the Chairman athte Memorial Sloan-Kettering Cancer Center, Department of Neurology, New York, NY.

Silver is a professor in the Deparment of Psychology at Barnard College, New York, NY.

Silverstein is a professor and Chairman at Columbia University. ❖

Nicholas Ralph DiPaola recently joined the Department of Surgery and Transplantation, Ohio State University, Columbus, OH. Prior to his new affiliation, DiPaola was associated with the Department of Cardiology, Cleveland Clinic Foundation, Cleveland, OH.

Marcelo Febo has affiliated with the Department of Psychiatry, University of Massachusetts School of Medicine, Worcester, MA. Febo was previously associated with the Department of Physiology, University of Puerto Rico, San Juan, PR.

Lynn A. Heinel accepted a position with the Department of Mathematics, Science and Technology, Montgomery County Community College, Blue Bell, PA. Heinel had been affiliated with the Department of Neurosurgery, Thomas Jefferson University, Philadelphia, PA,

Wissam H. Joumaa has affiliated with the Laboratory Physiology Generale, Lecomest, Beirut, Lebanon. Joumaa formerly was associated with the Laboratory Physiology Generale, Nantes University Faculty of Science, Nantes, France.

Timothy R. Koch recently moved to the Division of GI Medicine, Medical College of Wisconsin, Milwaukee, WI. Koch was associated with the Department of GI Medicine, West Virginia University Health Science Center, Morgantown, WV.

Kathryn E. Meier is presently affiliated as Professor and Chair with the Department of Pharmaceutical Sciences, Washington State University, Pullman, WA. Meier was formerly with the Department of Pharmacology, Medical University of South Carolina, Charleston, SC.

Kevin D. Monahan is currently with the Division of Cardiology, Penn State College of Medicine, Milton S. Hershey Medical Center, Hershey, PA. Monahan had been affiliated with the Department of Kinesiology and Applied Physiology, University of Colorado, Boulder, CO.

Hiroaki Oda recently accepted the position of Director, Oda Medical Clinic, Hiroshima, Japan. Oda was formerly affiliated with the Department of Medicine, Kure National Hospital, Kure, Hiroshima, Japan.

Peter Marc Piermarini has joined the Department of Cellular and Molecular Physiology, Yale University School of Medicine, New Haven, CT. Piermarini was formerly with the Department of Zoology, University of Florida, Gainesville, FL.

Ashok Kumar Saluja has joined the Department of Surgery, Pancreatic Diseases Center, University of Massachusetts Medical School. Worcester, MA. Formerly, Saluja was affiliated with the Department of Surgery, Harvard Medical School, Boston, MA.

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Richard J. Traystman has been appointed Associate Vice-President for Research Planning and Development, Oregon Health and Science University, Portland, OR. Traystman had been District Research Professor and Senior Vice Chair Research, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, MD.

Tetsuro Urushidani is presently Head of the Department of Cell and Molecular Toxicology, National Institute of Health Sciences, Tokyo, Japan. Formerly, Urushidani was associated with the Laboratory of Pharmacology and Toxicology, University of Tokyo, Graduate School of Pharmaceutical Science, Tokyo, Japan.

Correction

The February 2003 issue of *The Physiologist* (46, 1, p. 36) inadvertently listed Pamela Parker Jones as having moved to the Department of Life Sciences at Winston-Salem State University. Jones has not moved and remains at the Department of Kinesiology and Applied Physiology at the University of Colorado, Boulder, CO. *The Physiologist* regrets this error.

The Physiologist
Vol. 46, No. 3, 2003

Call for Ideas

We are seeking ideas. Specifically, we seek the help of the international health research community in identifying the greatest scientific and technological challenges in global health the principal current challenges standing in the way of major progress. The Bill & Melinda Gates Foundation has committed $200 million to establish the Grand Challenges in Global Health initiative as a major new effort in partnership with the National Institutes of Health (NIH) and the Foundation for the National Institutes of Health (FNIH). Our aim is to identify 10 to 15 critical scientific and/or technical challenges, which, if solved, could lead to important advances against diseases and improve health in the developing world.

This *Call for Ideas* is a call for your recommendations, and is the first step in a novel two-phase approach. Between now and June 15, we are asking health researchers around the world to submit their ideas on what they consider to be the scientific Grand Challenges in Global Health at this time. The Scientific Board that I chair will then review the submissions and select the 10 to 15 most compelling challenges as official Grand Challenges for the initiative. These Grand Challenges will be announced this fall, and solicitations for research grant proposals to address them will follow.

Our Web site, http://www.grandchallengesgh.org, provides a working definition of what we mean by grand challenges, details on the *Call for Ideas*, instructions for submitting recommendations, an electronic submission form and a list of the Scientific Board members. Researchers who do not have access to the Web may send an Email message to info@grandchallengesgh.org, specifying whether they can receive a PDF file or want the information faxed to a specific number.

Submission of ideas through the Web site is preferred, but those unable to use this form of submission may Email their responses to callforideas@grandchallengesgh.org or Fax them to 1-301-480-2752. Please read the *Call for Ideas* material carefully and follow the recommended format for submission.

Responses are due by **June 15, 2003.**

Harold E. Varmus
Chairman, Scientific Board
Grand Challenges in Global Health

Primer on Sleep Disorders for the Primary Care Physician

Date: October 3-4, 2003
Location: Johns Hopkins University, School of Medicine, Thomas B. Turner Auditorium, Baltimore, MD

Sponsored by: Johns Hopkins University School of Medicine, Division of Pulmonary and Critical Care Medicine

The medical aspects of sleep have shown progressive importance over the last two to three decades. Sleep problems are a very common reason for visits to primary care physicians. However, sleep histories are rarely obtained and information about sleep and its disorders are minimally touched upon in most medical school curricula. In this course we will discuss the fundamental aspects of sleep and sleep deprivation, review techniques on screening and testing for sleep disorders, and review the diagnosis and treatment for several common sleep complaints and disorders.

Accreditation and Credit Designation Statements: The Johns Hopkins University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The Johns Hopkins University School of Medicine takes responsibility for the content, quality and scientific integrity of this CME activity.

The Johns Hopkins University School of Medicine designates this educational activity for a maximum of 7.75 hours in category 1 toward the AMA Physician s Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the activity.

Registration: :Registration Deadline: September 30, 2003

Fees: Physicians, Residents*, Fellows*, and Allied Health Professionals
*with verification of status $150

Contact: Conference Coordinator, Johns Hopkins University School of Medicine, Office of Continuing Medical Education, Turner 20, 720 Rutland Ave., Baltimore, MD 21205-2195; Tel. 410-955-2959, Fax: 410-955-0807, Email cmenet@jhmi.edu. Web: http://www.hopkinscme.org/cme.

Pain Management Grand Round

Pain Management Grand Round
Date: Ongoing, March 2003-March 2004
Sponsor: Johns Hopkins University, School of Medicine
Location: http://www.hopkinscme.edu

The target audience includes, but should not be limited to: Anesthesiologists, Oncologists, Orthopedic Surgeons, Physical Medicine and Rehabilitation Specialists, Internists, Trauma Surgeons, General Physicians, and other clinicians and nurse practitioners involved in chronic pain management. The Johns Hopkins University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The Johns Hopkins University School of Medicine designates this educational activity for a maximum of one category one credit toward the AMA Physician s Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the activity.

Fees: None

Contact: Kristen Hughes, Office of Continuing Medical Education/ Funded Programs, Johns Hopkins University, School of Medicine, Turner 20, 720 Rutland Ave., Baltimore, MD 21205-2195; Tel. 410-955-2959, Web: http://www.hopkinscme.edu.

Wiley Prize in the Biomedical Sciences

Founded in 1807, Wiley is a global publisher of print and electronic products, specializing in scientific, technical, and medical books, journals, and reference works. Over the last century, Wiley has developed a strong reputation by publishing and disseminating information on significant advancements in science, technology, and medicine, contributed by prominent researchers and scientists from a vast community of scholars worldwide. By creating the Wiley Prize in the Biomedical Sciences, Wiley wishes to acknowledge the contributions of that community to our corporate success, as well as to recognize and foster ongoing excellence in scientific achievement and discovery.

The Wiley Foundation has been established as the endowing body to support the Wiley Prize in the Biomedical Sciences. The establishment of the foundation will enable the award to endure in perpetuity, and will provide an organizational structure to launch future awards in the sciences and humanities.

The Wiley Prize in the Biomedical Sciences is intended to recognize contributions that have opened new fields of research or advanced novel concepts or their applications in a particular biomedical discipline. The award may recognize a specific contribution or a series of contributions that demonstrate the nominee s significant leadership in the development of research concepts or their clinical application.

The award will consist of a $25,000 grant and each year s recipient will deliver a lecture at Rockefeller University the venue for the awards.

Professor G nter Blobel, recipient of the 1999 Nobel Prize in Physiology or Medicine, is serving as chair of the Wiley Prize jury. The other jurors are Dr. Qais Al-Awqati, a physiologist at Columbia University s College of Physicians and Surgeons, and Dr. David J. Anderson, a developmental neurobiologist at the California Institute of Technology.

The evaluations by the jurors of the contributions of the nominees will depend heavily on the information supplied in the nomination packets. Therefore, the nominations should be as complete, current, and accurate as possible.

More than one scientist may be nominated if they have worked as a team. At the jurors discretion, the award may also be made to more than one individual if they have independently made comparable contributions in their field.

Wiley invites and encourages the nomination of exceptional PhD and MD scientists whose research has set the standard for excellence. More than one nomination can be made from the same organization. International nominations are eligible and the number of years in a position is not relevant to the nomination.

For additional information about nominating candidates for the Wiley Prize, contact: Tel: 201-748-6783; Fax: 201-748-6940; Email: dwiley@wiley.com.

A distinguished panel of jurors will select the scientists to be honored. The Wiley Prize in the Biomedical Sciences will be awarded in the spring of 2004.

July 9-13

Enteric Nervous System Conference 2003, Banff, Alberta, Canada. *Information:* Dr. Keith Sharkey, Department of Physiology and Biophysics, University of Calgary, 2220 Hospital Drive NW, Calgary, AB, Canada. Phone: 403-220-4601; Fax: 403-283-3028; Email: ksharkey@ucalgary.ca; Internet: http://www.med.ucalgary.ca/webs/ENS/index2.html.

July 10-15

6th IBRO World Congress on Neuroscience, Prague, Czech Republic. *Information:* Email: pejsar@guarant.cz; Internet: http://www.IBRO2003.cz

July 12-17

2003 FASEB Summer Research Conferences Transport ATPases: Genomics, Mechanisms and Relevance to Diseases, Vermont Academy, Saxton River, Vermont. *Information:* Adele Hewitt , Conference Coordinator, FASEB Summer Research Conferences, 9650 Rockville Pike, Bethesda, Maryland 20814. Tel.: 301-530-7094; Fax: 301-571-0550; Email: ahewitt@faseb.org; Internet: http://www.faseb.org/meetings/src

July 13-16

12th International Biochemistry of Exercise Conference, Maastricht, The Netherlands. *Information:* Marleen van Baak. Email: m.vanbaak@hb.unimaas.nl, Internet: http://www.biochemex.org/IBEC2003/

July 17-19

BioThailand 2003: Technology for Life, Pathaya, Chonburi Thailand. *Information:* National Center for Genetic Engineering and Biotechnology (BIOTEC), 113 Paholyothin Rd., Klong 1, Klong Luang, Pathumthani 12120 THAILAND. Tel: 0 2564 6700 ext. 3445; Fax: 0 2564 6704, Email: sunsanee@biotech.or.th; Internet: http://biothailand2003.biotec.or.th/

July 20-24

XIX International Congress of Biochemistry & Molecular Biology, Toronto, Canada. *Information:* Congress Secretariat, National Research Council Canada, Ottawa, ON, Canada K1A 0R6. Tel: 613-993-9431, Fax: 613-993-7250; Email: iubmb2003@nrc.ca; Internet: http://www.nrc.ca/confserv/iubmb2003.

August 15-20

First Gordon Research Conference on Cellular Osmoregulation: Sensors, Transducers and Regulators, Bristol, RI. *Information:* Conference Co-Chairs Janet M. Wood (jwood@uoguelph.ca) and Karlheinz Altendorf (altendorf@biologie.Uni-Osnabrueck.de) or Gordon Research Conferences, P.O. Box 984, West Kingston, RI 02892-0984 USA. Internet: http://www.grc.org/scripts/dbml.exe?Template=/Application/apply1.dbm

August 20-23

International Society of Adaptive Medicine 7th International Congress, San Diego, CA

Information: University of California, San Diego, Office of Continuing Medical Education, La Jolla, CA 92093-0617. Toll free: 888-229-6263 or Tel: 858-534-3940; Fax: 858-534-7672; E-mail: ocme@ucsd.edu; Internet: http://cme.ucsd.edu/isam/index.html

August 23-26

33rd International Hospital Congress - From Vision to Action - Hospitals for a Healthy Future combined with 2003 Health Forum and American Hospital Association's Leadership Summit, San Francisco, CA

Information: Internet: http://www.hospitalconnect.com/healthforum/hfeducation/hfsummit.html.

September 7-12

XIIIth International Conference on Invertebrate Dioxygen Binding Proteins, Mainz, Germany. *Information:* Internet: http://www.io2bip.uni-mainz.de/

September 10-14

Aldosterone and ENaC: From Genetics to Physiology, Banff, Canada. *Information:* APS Conference Office, The American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. Tel.: 301-634-7967; Fax: 301-634-7241; Email: meetings@the-aps.org; Internet: http://www.the-aps.org.

September 11-19

Genetic Approaches to Complex Heart, Lung and Blood Diseases, Bar Harbor, Maine. *Information:* Application for this course are being accepted by the Jackson Laboratory, 600 Main Street, Bar Harbor, ME 04609-1500. Tel: 207-288-6263; Fax: 207-288-6080; Email: kgk@jax.org; Internet: http://www.jax.org/courses/hlb_03.html

September 27-October 1

European Respiratory Society Annual Congress 2003,Vienna, Austria. *Information:* ERS Headquarters, 1, boulevard de Grancy, CH-1006 Lausanne, Switzerland; Fax: +41 21 617 28 65; Internet: http://www.ersnet.org.

September 29-30

3rd Annual Meeting of the Safety Pharmacology Society, The Netherlands. *Information:* Contact the Safety Pharmacology Society, P.O. Box 7033, Audubon, PA 19407. Fax: 610-630-1544; Email: execdir@safetypharmacology.org

October 1-4

Understanding Renal and Cardiovascular Function Through Physiological Genomics, Augusta, GA. *Information:* APS Conference Office, The American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. Tel.: 301-634-7967; Fax: 301-634-7241; Email: meetings@the-aps.org; Internet: http://www.the-aps.org.