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Citation Statistics for the Individual Journals of *The American Journal of Physiology*

Brenda B. Rauner

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The Institute for Scientific Information (ISI) publishes Impact Factors for 60 journals in its Physiology category. Table 1 provides a ranking of the top 16 physiology journals in 1996. This Impact Factor is based on the citations to a journal of items published in 1995 and 1996, divided by the total number of items published by a journal in those two years. The top-ranking physiology journal was the Society's *Physiological Reviews (PRV)*, with an Impact Factor of 19.38. The *American Journal of Physiology* was ranked 8th among 60 physiology journals with an Impact Factor of 3.32. For other Society journals, the *Journal of Neurophysiology (JN)* ranked 7th, *News in Physiological Sciences (NIPS)* ranked 15th, and the *Journal of Applied Physiology (JAP)* ranked 16th. The citation half-life is the number of journal publication years going back from the current year (1996) that account for 50% of the total citations received by the cited journal in the current year. Note that the *JAP* ranks 6th in this category, *PRV* ranks 8th, and *JN* ranks 10th.

Unfortunately, it has not been possible to assess the scientific impact of the individual *AJP* journals using the Impact Factor analysis because ISI does not track citation information for the individual *AJP* journals. In general, authors cite articles from these journals by using the volume and page numbers of the consolidated *American Journal of Physiology*, hence over

the years ISI has only provided the Impact Factors for the consolidated *AJP*. In 1994 the Publications Committee commissioned ISI to provide us with this information because of our need to know the citation history of the individual journals. The results were published in the June 1995 issue of *The Physiologist*. The Society asked ISI to update the study in 1998, and the results are published here for your information. Even though Impact Factors per se were not obtained because of the study design, the analysis did provide the Society with useful citation statistics. As in 1994, the study determined the number of times an individual *AJP* journal bibliographic published item was cited in the ISI database of approximately 4,500 biomedical journals, but this time the period was for 10 years (1987 to 1996) instead of 7 years.

The new study also compared the individual *AJP* journals with each other (Table 2). For the *American Journals of Physiology, AJP: Renal Physiology* has the largest mean citation score of 20.55 over the ten-year cumulative period. *AJP: Cell Physiology* ranks second with a mean citation score of 20.14.

As part of the study, ISI was asked to do a similar citation analysis on "competing" journals identified by our editors. Table 3 compares statistics for the individual *AJP* journals and the "competing" journals.

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Citation Statistics for AJP

(continued from page 109)

Table 1. ISI©SCI©JCR©1996 Impact Factor Ranking of First 16 Journals in a List of 60 Physiology Journals

Journal Name	Impact Factor	Cited Half-Life
<i>Physiological Reviews*</i>	19.38	8.1
<i>Annual Review of Physiology</i>	14.55	6.3
<i>Reviews of Physiology Biochemistry and Pharmacology</i>	9.90	9.6
<i>Journal of General Physiology</i>	4.98	9.3
<i>Advances in Microbial Physiology</i>	4.75	10.0
<i>Journal of Physiology-London</i>	3.90	9.5
<i>Journal of Neurophysiology*</i>	3.83	7.2
<i>American Journal of Physiology*</i>	3.32	6.0
<i>Pfluegers Archiv-European Journal of Physiology</i>	2.96	8.5
<i>Journal of Cellular Physiology</i>	2.84	6.7
<i>Psychophysiology</i>	2.82	9.3
<i>Journal of Membrane Biology</i>	2.73	7.4
<i>Chemical Senses</i>	2.67	6.1
<i>Journal of Vascular Research</i>	2.48	3.1
<i>News in Physiological Sciences*</i>	2.21	4.4
<i>Journal of Applied Physiology*</i>	2.05	9.1

* A journal of The American Physiological Society

Table 2. Cumulative Citation Statistics for Individual AJP Journals 1987 - 1996

Journal Name	Items Published	Citations	Items Cited	Mean, Cited Items	Uncited Items	Mean, All Items
<i>AJP: Cell Physiology</i>	3,258	47,969	2,382	20.14	876	14.72
<i>AJP: Endocrinology and Metabolism</i>	2,664	32,941	1,982	16.62	682	12.37
<i>AJP: Gastrointestinal and Liver Physiology</i>	2,730	34,833	2,132	16.34	598	12.76
<i>AJP: Lung Cellular and Molecular Physiology*</i>	1,329	11,885	819	14.51	510	8.94
<i>AJP: Heart and Circulatory Physiology</i>	5,187	69,449	3,839	18.09	1,348	13.39
<i>AJP: Renal Physiology</i>	2,840	46,052	2,241	20.55	599	16.22
<i>AJP: Regulatory, Integrative, and Comparative Physiology</i>	3,845	36,079	2,905	12.42	940	9.38

*Founded August 1988. Items Published, bibliographic items published from 1987-1996; Citations, total citations received by items; Items Cited, number of articles cited at least once; Mean, Cited Items, average number of cites per item based on citations to cited items only; Uncited, number of items never cited; Mean, All Items, average number of cites per item based on citations to all items.

Citation Statistics for AJP

Table 3. Statistics for the Individual AJP Journals and Journals That Compete With AJP

Journal Name	Items Published	Citations	Items Cited	Mean Cited Items	Uncited Items	Mean, All Items
AJP: Lung Cellular and Molecular Physiology	1,329	11,885	819	14.51	510	8.94
<i>American Journal of Respiration Cell Mol. Biol.</i>	1,270	15,059	1,087	13.85	183	11.86
<i>Experimental Lung Research</i>	554	3,911	446	8.77	108	7.06
AJP: Heart and Circulatory Physiology	5,187	69,449	3,839	18.09	1,348	13.39
<i>Circulation Research</i>	2,875	78,895	2,644	29.84	231	27.44
<i>Cardiovascular Research</i>	2,180	15,538	1,637	9.49	543	7.13
AJP: Renal Physiology	2,840	46,052	2,241	20.55	599	16.22
<i>Journal of the American Society of Nephrology</i>	11,203	10,071	2,086	4.83	9,117	0.90
<i>American Journal of Kidney Disorders</i>	2,663	17,529	1,888	9.28	775	6.58
<i>Kidney International</i>	16,811	70,444	6,102	11.54	10,709	4.19
AJP: Regulatory, Integrative Comp. Physiol.	3,845	36,079	2,905	12.42	940	9.38
<i>Journal of Experimental Biology</i>	2,437	18,640	2,042	9.13	395	7.65
<i>Journal of Physiology-London</i>	15,186	108,763	8,221	13.23	6,965	7.16
AJP: Cell Physiology	3,258	47,969	2,382	20.14	876	14.72
<i>Cell</i>	4,811	613,915	4,570	134.34	241	127.61
<i>Journal of Biological Chemistry</i>	38,793	1,015,605	35,010	29.01	3,783	26.18
<i>Molecular Biology of the Cell</i>	5,385	10,982	913	12.03	4,472	2.04
<i>Journal of Clinical Investigation</i>	6,374	223,280	5,809	38.44	565	35.03
AJP: Endocrinology and Metabolism	2,664	32,941	1,982	16.62	682	12.37
<i>Endocrinology</i>	8,185	156,099	7,395	21.11	790	19.07
<i>Diabetes</i>	6,942	57,919	3,003	19.29	3,939	8.34
AJP: Gastrointestinal and Liver Physiology	2,730	34,833	2,132	16.34	598	12.76
<i>Gastroenterology</i>	29,912	106,455	10,876	9.79	19,036	3.56
<i>Hepatology</i>	16,306	61,772	5,509	11.21	10,797	3.79

See legend to Table 2 for definitions of column headings.

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Journal Impact Factor Rankings

Long-Term Vs. Short-Term Journal Impact: Does It Matter?

Eugene Garfield

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The first published report on journal impact factors was included in E. Garfield, I.H. Sher, "New factors in the evaluation of scientific literature through citation indexing," *American Documentation*, 14[3]:195-201, July 1963. The late Irving H. Sher, who then was director of R&D at the Philadelphia-based Institute for Scientific Information (ISI), and I created the impact factor to help evaluate and select journals for *Current Contents*. The current impact factor is determined by counting citations in the current year's publications to papers published in the previous two years and dividing by the number of papers published in the same period. Editors often have complained that this measure, which records average influence in the first and second years after publication, is biased against journals in slow-moving fields. They have argued that measurement of long-term impact would show such journals in a better light.

The original reason for creating the impact factor was to make sure that *Current Contents* covered the most significant journals. Thus, a current impact calculation, based on the two preceding years of publications, served us well enough. Later, ISI started to produce its *Journal Citation Reports (JCR)* as a byproduct of the *Science Citation Index*. Publishing long-term journal impact data was not considered a high-priority, but the data were there for those persistent enough to combine the input from consecutive annual *JCR* volumes.

Recently, ISI's Journal Performance Indicators database became available. [For information, contact David Pendlebury at ISI; (215) 386-0100, Ext. 1411.] The 1995 edition, which contains publication and citation data on ISI-indexed journals for each year from 1981 to 1995, helped us examine short- and long-term changes in journal citation rates. We used papers published in 1981-1982 and in 1989-1990 as the source groups of cited articles, and used the database to compile 15-year and seven-year cumulative impact data, from 1981-1995 and 1989-1995, respectively. The study was limited to journals that published more than 200 articles in 1981-1982 and eliminated all

review journals regardless of size.

The table that follows includes the 100 journals with the highest cumulative impact based on 15 years of data. The first group of columns shows the number of articles published in 1981-1982, the total cumulated citations over 15 years, the impact measured as citations per article, and the impact rank. This is followed by the ranking for each journal when then-current impact factors were published in 1983. The second group of columns shows the same data for the 1989-1990 articles, with the rank based on seven-year citation data and the then-current impact factor measured in 1991.

Prominent Rankings Retained

With few exceptions, the top journals in terms of citations and productivity retain prominent rankings. The top 10— *Cell*, *New England Journal of Medicine*, *Journal of Experimental Medicine*, *Journal of Cell Biology*, *Proceedings of the National Academy of Sciences*, *Archives of General Psychiatry*, *Journal of Clinical Investigation*, *Nature*, *Journal of Molecular Biology*, and *Science*— are the highest impact when measured over two-, seven-, or 15-year periods.

Significant changes between current and cumulative impact rankings indeed do occur. *Archives of General Psychiatry*, *Molecular and Cell Biology*, *EMBO Journal*, and *Circulation Research* move up by 12 or more positions when one looks at long-term impact. Even more dramatic shifts occur for the *Journal of Lipid Research*, *Journal of Histochemistry and Cytochemistry*, and several physiology journals, including the *American Journal of Physiology*, *Journal of General Physiology*, *Journal of Neurophysiology*, and *Journal of Physiology (London)*.

On the other hand, significant downward changes in the rankings occur for such journals as *Endocrinology*, *Kidney International*, *Journal of Virology*, and almost all letters journals. These changes can be attributed to a variety of factors. For letters journals, one can assume that the authors went on to publish other work that superseded their earlier short reports. On the other hand, some journals may have improved long-term ranks owing to cumulative effects of a few highly cited "Citation Classics." More than one third of the citations to articles published in 1981-82 in *Journal of Histochemistry and*

Cytochemistry were to a single article by S.M. Hsu et al. (29:527-80, 1981).

My report entitled "The Significant Scientific Literature Appears In A Small Core Of Journals" (*The Scientist*, Sept. 2, 1996, page 13) listed the 50 journals that were most cited in absolute terms in 1994 and the 50 that published the largest number of articles. Many of these journals do not appear in the new lists ranked by long-term cumulative impact. These titles include the *Journal of Geophysical Research*, *Physical Review B*, *Journal of Chemical Physics*, *Brain Research*, and *Biochimica et Biophysica Acta*. Few would dispute the significance of these large journals in their respective fields, but further study is required to fully understand these data.

Current vs. Long-Term Impact Rankings

The new data reported here show dramatic changes in impact rankings. How would these data affect journal selection based on current impact? Since meaningful comparisons can be made only within subject categories, the key question is whether these data affect ranking *within* a field such as physiology. Cross-disciplinary comparisons may not take into account the innate character of physiological research, in which advances may not be absorbed as rapidly as in other fields. Will journal rankings within categories differ significantly using a long-term impact? Or are current data good predictors of future rankings within the field?

It is impossible without an article-by-article audit of each journal to make absolute comparisons. For example, more than 20 percent of the articles in *Cell* are reviews. This inflates its already high impact and ranking. Most other journals do not include this proportion of review articles. The *New England Journal of Medicine* does publish a large number of review articles, but most leading biomedical research journals do not.

The data reported here are subject to human error, since they are a derivative of a large database. It is impossible to equate all publishing units involved, but I believe that the results reported will generally support independent peer-review judgments of the importance of these journals in contemporary life sciences. Every reasonable effort has been made to ensure accuracy, but the original data sources should be consulted to validate the results.

This article originally appeared in the February 2, 1998 issue of The Scientist and is reprinted with permission.

Journal Impact Factor Rankings

Table 1. Long-term vs. Short-term Journal Impact

Journal Name	'81-'82 Source Items	Citations '81-'95	15- Year IF	15- Year Rank	IF Rank in '83	'89-'90 Source Items	Citations '89-'95	7- Year IF	7- Year Rank	IF Rank in '91
<i>Cell</i>	803	110,330	137.4	1	2	977	157,456	161.2	1	1
<i>New England Journal of Medicine</i>	757	89,106	117.7	2	1	742	82,163	110.7	2	2
<i>Journal of Experimental Medicine</i>	665	61,017	91.8	3	4	780	53,340	68.4	5	10
<i>Journal of Cell Biology</i>	812	71,249	87.7	4	7	969	60,194	62.1	7	11
<i>Proceedings of the National Academy of Sciences</i>	3,206	279,206	87.1	5	8	4,262	254,452	59.7	8	12
<i>Archives of General Psychiatry</i>	313	26,213	83.7	6	18	233	11,907	51.1	9	18
<i>Journal of Clinical Investigation</i>	735	59,087	80.4	7	11	1,100	53,456	48.6	10	16
<i>Nature</i>	2,737	216,130	79.0	8	6	2,169	214,942	99.1	4	4
<i>Journal of Molecular Biology</i>	668	48,135	72.1	9	19	800	26,744	33.4	21	38
<i>Science</i>	2,065	146,278	70.8	10	9	1,684	178,622	106.1	3	3
<i>Molecular and Cellular Biology</i>	305	20,783	68.1	11	24	1,528	63,608	41.6	13	21
<i>Journal of Neuroscience</i>	303	19,778	65.3	12	5	774	30,749	39.7	14	31
<i>Brain</i>	89	5,750	64.6	13	215	189	4,746	25.1	37	108
<i>EMBO Journal</i>	227	14,624	64.4	14	25	1,022	68,320	66.8	6	9
<i>Circulation Research</i>	441	27,167	61.6	15	30	629	19,935	31.7	24	40
<i>Neuroscience</i>	469	28,239	60.2	16	23	798	19,138	24.0	43	93
<i>Annals of Internal Medicine</i>	607	35,759	58.9	17	10	509	22,824	44.8	12	13
<i>Journal of Histochemistry & Cytochemistry</i>	365	20,853	57.1	18	52	453	7,061	15.6	86	183
<i>Nucleic Acids Research</i>	1,196	68,174	57.0	19	16	3,473	62,341	18.0	70	144
<i>Journal of General Physiology</i>	163	9,258	56.8	20	110	223	6,278	28.2	27	46
<i>Journal of Comparative Neurology</i>	636	35,524	55.9	21	35	971	23,029	23.7	45	83
<i>Journal of Immunology</i>	1,988	110,005	55.3	22	15	2,508	93,080	37.1	16	24
<i>Journal of Biological Chemistry</i>	4,600	253,489	55.1	23	19	6,627	243,943	36.8	17	25
<i>Astrophysical Journal Supplement Series</i>	136	7,465	54.9	24	48	206	5,693	27.6	28	71
<i>Blood</i>	767	41,550	54.2	25	17	1,413	54,271	38.4	15	19
<i>Circulation</i>	928	49,945	53.8	26	12	990	36,424	36.8	18	14
<i>Journal of Neurophysiology</i>	337	17,593	52.2	27	56	465	11,673	25.1	38	86
<i>Lancet</i>	1,288	66,336	51.5	28	3	942	44,982	47.8	11	6
<i>Hepatology</i>	189	9,699	51.3	29	199	522	11,389	21.8	54	74
<i>Gastroenterology</i>	647	32,583	50.4	30	21	887	21,287	24.0	42	35
<i>American Journal of Medicine</i>	625	30,354	48.6	31	28	987	13,660	13.8	93	180
<i>Journal of Physiology-London</i>	900	43,442	48.3	32	77	866	23,001	26.6	32	43
<i>Diabetes</i>	473	22,682	48.0	33	26	547	13,275	24.3	41	50
<i>Physical Review Letters</i>	2,028	95,971	47.3	34	14	3,054	109,227	35.8	20	22
<i>Laboratory Investigation</i>	292	13,299	45.5	35	36	330	8,381	25.4	36	53
<i>Analytical Biochemistry</i>	1,181	53,431	45.2	36	118	1,026	14,046	13.7	95	238
<i>Gene</i>	334	14,945	44.7	37	29	1,163	23,878	20.5	58	141
<i>American Journal of Cardiology</i>	794	35,288	44.4	38	20	1,701	21,759	12.8	98	234
<i>Journal of Molecular Evolution</i>	105	4,606	43.9	39	13	214	3,976	18.6	66	152
<i>Annals of Neurology</i>	406	17,744	43.7	40	78	419	13,150	31.4	25	37
<i>Geochimica et Cosmochimica Acta</i>	405	17,620	43.5	41	67	542	10,456	19.3	62	125
<i>Journal of the American Chemical Society</i>	3,717	160,615	43.2	42	33	3,968	97,647	24.6	40	60
<i>Pflugers Archiv-European Journal of Physiology</i>	429	18,443	43.0	43	105	489	7,711	15.8	84	137
<i>European Journal of Immunology</i>	377	15,951	42.3	44	22	814	22,215	27.3	29	49
<i>Journal of Lipid Research</i>	310	13,077	42.2	45	53	442	9,760	22.1	52	100
<i>Molecular Pharmacology</i>	395	16,501	41.8	46	32	503	14,566	29.0	26	56
<i>Ecology</i>	431	17,560	40.7	47	168	423	7,430	17.6	73	189
<i>Journal of Clinical Endocrinology and Metabolism</i>	891	35,565	39.9	48	55	913	20,765	22.7	49	101
<i>Journal of Membrane Biology</i>	295	11,674	39.6	49	47	303	5,767	19.0	63	106
<i>American Journal of Pathology</i>	349	13,785	39.5	50	70	567	18,158	32.0	22	44

Journal Impact Factor Rankings

Table 1. (continued)

Journal Name	'81-'82 Source Items	Citations '81-'95	15- Year IF	15- Year Rank	IF Rank in '83	'89-'90 Source Items	Citations '89-'95	7- Year IF	7- Year Rank	IF Rank in '91
<i>Developmental Biology</i>	662	26,125	39.5	51	69	557	13,272	23.8	44	75
<i>Biochemistry</i>	2,193	85,882	39.2	52	40	2,947	79,470	27.0	31	52
<i>Cancer Research</i>	1,701	65,597	38.6	53	54	2,480	67,374	27.2	30	66
<i>Journal of Allergy and Clinical Immunology</i>	277	10,679	38.6	54	81	491	8,269	16.8	78	120
<i>American Review of Respiratory Disease</i>	695	26,573	38.2	55	39	1,039	24,255	23.3	46	62
<i>Journal of Pharmacology and Exp. Therapeutics</i>	938	35,442	37.8	56	68	1,393	28,406	20.4	59	98
<i>Journal of Infectious Diseases</i>	539	20,216	37.5	57	46	743	19,273	25.9	34	55
<i>Hypertension</i>	364	13,646	37.5	58	57.1	453	11,886	26.2	33	42
<i>Contributions to Mineralogy and Petrology</i>	241	9,004	37.4	59	181	241	3,526	14.6	91	132
<i>American Journal of Physiology</i>	1,999	74,138	37.1	60	101	4,133	78,621	19.0	64	124
<i>Endocrinology</i>	1,410	52,215	37.0	61	38	1,707	43,836	25.7	35	61
<i>Limnology and Oceanography</i>	260	9,599	36.9	62	155	299	5,061	16.9	77	199
<i>Kidney International</i>	415	15,041	36.2	63	37	609	13,953	22.9	47	36
<i>Earth and Planetary Science Letters</i>	394	14,161	35.9	64	84	344	6,300	18.3	68	145
<i>Annals of Surgery</i>	448	15,939	35.6	65	112	392	8,878	22.6	50	122
<i>Neuroendocrinology</i>	273	9,711	35.6	66	76	425	7,444	17.5	75	128
<i>Journal of Virology</i>	1,007	35,686	35.4	67	35	1,658	52,623	31.7	23	29
<i>American Journal of Epidemiology</i>	348	12,309	35.4	68	145	480	9,500	19.8	60	131
<i>Proceedings of the Royal Society of London</i>	178	6,261	35.2	69	102	195	2,899	14.9	90	311
<i>Journal of Magnetic Resonance</i>	530	18,623	35.1	70	123	705	11,239	15.9	83	206
<i>International Journal of Cancer</i>	458	16,077	35.1	71	61	791	13,447	17.0	76	155
<i>Nuclear Physics B</i>	1,014	35,366	34.9	72	31	1,251	26,502	21.2	55	51
<i>Diabetologia</i>	360	12,549	34.9	73	41	259	5,718	22.1	53	63
<i>Pain</i>	153	5,308	34.7	74	232	310	5,585	18.0	69	102
<i>Brain Research</i>	2,383	82,465	34.6	75	99	3,212	53,591	16.7	79	188
<i>Astrophysical Journal</i>	2,707	93,577	34.6	76	48	2,955	52,917	17.9	72	116
<i>Evolution</i>	256	8,790	34.3	77	211	301	6,682	22.2	51	140
<i>Journal of Neurochemistry</i>	1,042	34,221	32.8	78	73	1,144	26,060	22.8	48	76
<i>Naunyn-Schmiedebergs Archives of Pharmacology</i>	364	11,936	32.8	79	57	424	6,955	16.4	81	112
<i>Cancer</i>	1,835	59,958	32.7	80	136	1,736	25,890	14.9	89	228
<i>Biochemical Journal</i>	1,673	54,267	32.4	81	89	2,073	42,817	20.7	56	88
<i>Gut</i>	364	11,775	32.3	82	64	558	8,506	15.2	88	129
<i>Life Sciences</i>	1,519	48,959	32.2	83	67.1	1,158	11,629	10.0	100	363
<i>American Journal of Psychiatry</i>	651	20,917	32.1	84	94	476	11,725	24.6	39	68
<i>European Journal of Biochemistry</i>	1,522	48,627	31.9	85	72	1,461	27,496	18.8	65	133
<i>Stroke</i>	264	8,400	31.8	86	148	556	10,895	19.6	61	130
<i>American Journal of Clinical Nutrition</i>	699	22,044	31.5	87	139	708	10,949	15.5	87	221
<i>Neurology</i>	575	18,114	31.5	88	214	847	17,491	20.7	57	79
<i>Clinical Pharmacology & Therapeutics</i>	434	13,671	31.5	89	42	319	5,026	15.8	85	113
<i>Cancer Genetics and Cytogenetics</i>	172	5,336	31.0	90	63	429	5,093	11.9	99	253
<i>British Journal of Haematology</i>	434	13,426	30.9	91	87	603	9,935	16.5	80	146
<i>Journal of Investigative Dermatology</i>	415	12,791	30.8	92	66	564	10,122	17.9	71	81
<i>British Journal of Psychiatry</i>	349	10,724	30.7	93	184	626	8,298	13.3	97	275
<i>Experimental Brain Research</i>	441	13,513	30.6	94	170	662	9,571	14.5	92	211
<i>American Journal of Surgical Pathology</i>	151	4,620	30.6	95	594	260	4,770	18.3	67	119
<i>Journal of Applied Physiology</i>	972	29,635	30.5	96	164	1,437	19,095	13.3	96	376
<i>American Naturalist</i>	364	11,034	30.3	97	218	210	3,354	16.0	82	205
<i>Journal of the National Cancer Institute</i>	635	19,174	30.2	98	110	397	14,206	35.8	19	23
<i>European Journal of Pharmacology</i>	1,120	33,769	30.2	99	65	1,616	28,368	17.6	74	97
<i>Journal of Catalysis</i>	599	17,985	30.0	100	189	611	8,409	13.8	94	219

Guyton Teacher of the Year

Connections: Physiology in the Medical Curriculum

Michael G. Levitzky, Louisiana State University Medical Center

When Michael Johnson called to tell me that I would receive this year's Guyton Award, I was first incredulous, then deeply honored and truly ecstatic.

For a title, I came up with "Connections: Physiology in the Medical Curriculum." At the time, I was thinking mainly of how important it is for physiology to connect to the clinical curriculum and to the residents and faculty of clinical departments, but the more I thought about it, the more important connections I realized physiology must make. Although this talk is given in the context of the medical school, I know that many in the audience teach in other settings and I hope that much of what I say is relevant to everyone. I also hope that my thoughts will not appear too pompous or like preaching.

In recent years there has been much discussion and debate about the direction and even the definition of physiology. Is it molecular? Cellular? Systemic? Is it, as some of us old timers believe, integrative? The boundaries between molecular physiology, cellular physiology, and other disciplines such as biochemistry and immunology are not clear. How do we maintain our identity and assure our future? I believe that in order to preserve our status as an independent discipline, Physiology (and physiologists) must establish and maintain connections with the rest of the basic science curriculum, with clinical medicine, with learning objectives, with medical and graduate students, with computer-assisted learning (CAL), with our schools, and with the public. These connections will also make us better teachers of physiology. Because of time constraints, I will discuss some of these in greater detail than others.

Connections to other basic science departments at first seems obvious. Many of us collaborate with faculty from other basic science departments in our research. What I want to stress, however, is con-

necting to other basic science departments in our teaching. We need to know exactly what they are teaching to avoid unintentional repetition. We must also be sure that the story we are telling is consistent with that given by other departments when they cover the same subject. This became more apparent to us when we instituted interdepartmental combined examinations in the first two years of the medical curriculum. These tests cover material from all the courses the medical students are taking at the same time. Our concept was to discourage cramming, improve the students' time management, and better prepare them for the USMLE. The order of questions is randomized, with no regard to what course they come from. Students told us that to answer a question correctly, they need to know what course the question came from because different courses told them different things. The same answer could be correct or incorrect, depending on who wrote the question. We had also hoped to foster writing questions or scenarios representing content from more than one course, a goal we have obviously not yet accomplished.

Connecting to clinical medicine, as I have already stated, was what I was thinking about when I came up with the title of this talk. Participating in ICM or similar courses, third and fourth year courses, and teaching residents and fellows has probably benefited me at least as much as it has those receiving the lectures, especially when clinical faculty attended and participated. From my experiences teaching anesthesiology and surgery residents and pulmonary and neonatology fellows I have learned what our first year students will need to know. I have learned not only what is relevant, but what is actually *used* in the practice of medicine. The Bohr equation for calculating physiological dead space (and alveolar dead space) is relevant, but not used; the shunt equation is both. Participating in resident and fellow instruction has shown me how the material I am teaching is important clinically. Participating in clinical case presentations with other basic science and clinical

faculty in our ICM course has forced me to learn some pulmonary pathophysiology and to relate the underlying physiology to the patient. I am both a better teacher and a better textbook writer as a result.

Just as it is important to connect physiology to the third and fourth year of medical school and to postgraduate medical training, it is important to connect clinical medicine to the first-year physiology course. We have more than 20 hours of lectures, case presentations, and even a small group session in our Medical Physiology Course. The presentations are carefully coordinated to the material being covered, and a real effort has been made to have the presenter show how important the underlying physiology and pathophysiology are to understanding and treating the problems of patients. Presenters have been chosen over the years by strict empirical methods (that is, trial and error).

Connecting to objectives is standard procedure for the members of the Teaching of Physiology Section. Each lecture or other instructional activity should have clearly stated learning objectives that are available to the students. These objectives should be used as the framework for student evaluation. My point is that these objectives should be developed with faculty from appropriate clinical departments and faculty from other basic science departments. This seems especially important as the Association of American Medical Colleges is developing learning objectives for medical student education in the Medical School Objectives Project. Thus far these objectives for the basic sciences are quite general, but they may not be so nonspecific in the future, especially in view of one of their other projects, which is to compile in a standardized World Wide Web-based format the curricula of all medical schools. This curriculum database project, as many of you know, is called *CurrMIT* (for Curriculum Management and Information Tool).

Connecting to medical students enhances their ability to learn physiology. Over the years I have found many ways to improve this connection. One is to show

Michael G. Levitzky received the sixth annual Arthur C. Guyton Physiology Teacher of the Year Award. The following is a speech delivered by Levitzky as he was presented the award at Experimental Biology '98 in San Francisco, CA in April 1998.

Guyton Teacher of the Year

them that you care about them as individuals; learning as many of their names as you can is a good start. Personal contact in laboratories and in small group instruction [even outside physiology—I have facilitated small groups in our Medical Ethics, Social Issues in Medicine and Problem-based Learning (PBL) Courses] is another way to interact with students on a personal basis. Unfortunately there are far fewer laboratories these days, so the more individual aspects of instruction may have to be in PBL or other situations, including social gatherings. Strongly encouraging students to come to ask questions or discuss material is another way to get to know students as individuals. In all interactions with them, it is important to treat them as colleagues or at least future colleagues.

Connecting to medical students (and connecting them to physiology) is much easier when you show them your enthusiasm for and excitement about physiology. I have been told a number of times that lectures are both more interesting and easier to remember if they appear to tell a story. Occasional humor (even if it is as bad as mine) is an invaluable method for renewing students' attention. Of course, our humor must be politically correct these days.

Remember that most medical students are not interested in research. They do not want to hear several opposing hypotheses, they want "facts." Guyton (the textbook, not the person) has always been dogmatic and a *lot* of copies of Guyton have not only been sold, but have even been read. It is our responsibility to encourage medical students to read and think critically. We must foster their interest in research and help them understand that everything in physiology and the rest of medicine is not either black or white as it is in most texts, but that much of it is gray.

Connecting to graduate students is very different from connecting to medical students. Many of the issues discussed about medical students are not a concern with graduate students because of the much more personal nature of graduate education. We spend many hours in one-on-one instruction in the laboratory or in small classes. Mentoring graduate stu-

dents is a topic worthy of its own discussion, and I have heard Barbara Horwitz, a previous recipient of the Guyton Award, talk about that in the past. I would like to state that it is important for their future careers as teachers, researchers, and grant applicants that we connect our graduate students to the clinical knowledge base appropriate to their research area. Another way to connect our graduate students to their futures is to help them improve their communications skills, both speech and writing. Although this may be obvious in students for whom English is a second language, it is just as important (and sometimes just as necessary) in those for whom it is not. This should be more than helping them prepare a manuscript for submission to a journal or write an abstract or a grant application. It should be designed to improve their ability to write, not simply to rewrite what they have written. It should also include help in planning and delivering oral presenta-



Rob Carroll presents the Teacher of the Year award to Michael Levitzky.

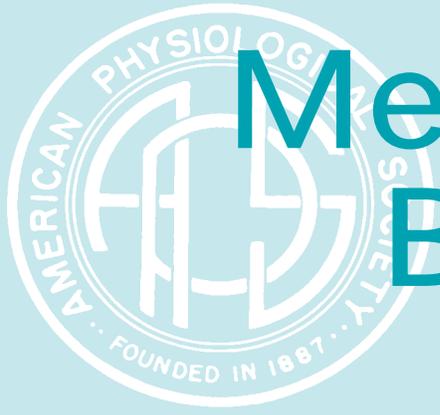
tions, not only seminars, but formal lectures to students.

My other words of alleged wisdom concerning graduate students is that you can not tell them anything. By that I mean that graduate students, at least the ones I have had in my laboratory, must prove things to themselves. They would not take my word for anything and that is exactly how it should be. Again, we must treat our graduate students like colleagues or at least future colleagues.

I have just a few more connections to mention. First, we must make use of computer-assisted learning (CAL) in physiology (and medical) education. Many of the people in this room have been pioneers in this, so I do not feel that I need to discuss it, nor am I qualified. But

I do feel that many of us can increase the use of computer simulations and the internet in our teaching. Some of the currently available simulations really can be used to replace part, but certainly not all, of what we have taught in the laboratory. Certainly some aspects of problem solving and critical thinking can be learned from such programs. However, CAL must be *required* of the students and not merely elective. Furthermore, CAL is by nature an individual activity, so we must take care to use laboratories, PBL, or other activities to preserve the personal touch with our students as we increase CAL in our instruction. Second, I think that it is important for physiology faculty to be connected to their schools. This means interacting with faculty from other departments in teaching efforts and serving on committees as well. These are not only personally rewarding, but they raise the profile of physiology as a department and as a discipline within your school because we repeatedly identify ourselves as being from or representing the Physiology Department. As John Spitzer emphatically pointed out to me early in my career, it is also important to attend your school's social functions. Finally, as last year's Guyton Award recipient, Donald Frazier, told us, it is important to connect to the public by outreach programs to schools, high schools, and colleges, and to involve both students and their teachers. This can be done by participating in science awareness programs, summer research programs, and many other ways. These programs can serve many purposes, including recruitment of graduate and medical students (especially from underrepresented groups, if that is still allowed), explaining how the body works, and showing how science and research really work. The last may be our most important task because of the generally poor coverage of science by the mass media.

In conclusion, I hope that I have demonstrated both the importance of connecting physiology (and physiologists) to the medical school curriculum and to students and faculty, and some means of doing so. Once again, thank you for selecting me as this year's Guyton Award recipient. ❖



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Membership Statistics

Total Membership	8,351	Distribution Primary by Section Affiliation (7,471 respondents)	APS Membership in the Americas	
Distribution by Employment (7,526 respondents)			US	7,409
	<i>No.</i> <i>%</i>		Canada	397
Physiology depts.	2,490 33.1	Cardiovascular	Brazil	31
Other preclinical depts.	596 7.9	Respiration	Mexico	14
Clinical	1,679 22.3	Cell & General	Argentina	8
Administration	46 0.6	Endocrinology and Metabolism	Chile	6
Hospitals and clinics	306 4.1	Environmental and Exercise	Peru	4
Veterinary schools	152 2.0	Renal	Venezuela	4
Dental schools	39 0.5	Central Nervous System	Grenada	2
Public health and grad. schools	132 1.8	Gastrointestinal	Jamaica	2
College or university	1,215 16.1	Comparative	British West Indies	1
Commercial companies	204 2.7	Neural Control and Autonomic Regu.	Costa Rica	1
Government	369 4.9	Teaching of Physiology		
Institutes and foundations	200 2.7	Water and Electrolyte Homeostasis		
Private practice	35 0.5			
Other, emeritus or inactive	63 0.8			
Distribution by Racial Background and Heritage (optional personal data)		Distribution by Group Affiliation (3,282 respondents)	US States With More Than 100 Members (50 states plus District of Columbia, Puerto Rico, Guam, and the Virgin Islands)	
	<i>Total respondents</i>		California	804
American Indian or Alaskan	20	MyoBio/Muscle Group	New York	584
Asian or Pacific Islander	742	Epithelial Transport Group	Texas	502
Black	87	History of Physiology Group	Pennsylvania	427
White	5,634	Hypoxia Group	Maryland	360
Hispanic	136	Members in Industry Group	Illinois	337
			Massachusetts	333
Distribution by Earned Degree (6,903 respondents — includes 1,192 individuals with multiple doctorate degrees)		Distribution by Primary Specialty (7,471 respondents)	Ohio	308
			Michigan	253
PhD	4,827		North Carolina	195
MD	2,796	Anesthesia	Florida	209
DVM	189	Anatomy and embryology	New Jersey	185
ScD	110	Biochemistry	Missouri	192
DDS	35	Biophysics	Virginia	152
EDD	25	Biomedical engineering	Connecticut	150
Cand. Med.	36	Blood	Wisconsin	148
		Cardiovascular	Georgia	146
Distribution by Sex (optional personal data)		Cellular and tissue	Tennessee	150
	<i>Total respondents</i>	Comparative physiology	Louisiana	133
Female	1,225	Electrolytes and water balance	Indiana	131
Male	6,148	Endocrines	Minnesota	134
		Energy metabolism and temperature	Washington	124
Distribution by Age (optional personal data)		Environment	Alabama	116
	<i>Total respondents</i>	Gastrointestinal	Iowa	115
70+	927	General physiology	Colorado	123
60-69	1,109	Gerontology	Arizona	112
50-59	1,798	Immunology	Kentucky	103
40-49	2,271	Liver and bile		
30-39	1,359	Lipids and steroids	APS Membership Outside the Americas (countries with five or more members)	
20-29	585	Minerals, bone, and teeth	Japan	168
		Muscle and exercise	Germany	100
Principal Type of Work (7,596 respondents)		Neurosciences	United Kingdom	82
	<i>%</i>	Nutrition and food	France	71
Research	76.7	Pharmacology	South Korea	54
Teaching	11.0	Radiology	Australia	51
Clinical	6.8	Renal	Italy	39
Administration	4.9	Reproduction	Denmark	37
Other	0.6	Respiration	Switzerland	39
		Other	Netherlands	34
			Spain	26
			Belgium	26

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Election of New Regular Members (114)

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Taiwan	23	
Israel	26	
Norway	17	
Hong Kong	10	
Austria	11	
New Zealand	11	
India	9	
Greece	7	
Hungary	7	
Poland	5	
Republic of South Africa	5	
Finland	5	
Turkey	5	
		<i>Other Countries Represented:</i> Belarus, Cameroon, Czech Republic, Iceland, Indonesia, Ireland, Luxembourg, Philippines, Portugal, Russia, SW Africa, Saudi Arabia, Serbia, Thailand, Ukraine, United Arab Emirates.
		Canadian Provinces With Five or More Members
	Ontario	168
	British Columbia	142
	Quebec	87
	Alberta	44
	Manitoba	21
	Saskatchewan	11
	Nova Scotia	10
		<i>Other Provinces Represented:</i> New Brunswick and Newfoundland.

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Houston, Texas

Gary Kovnat
Mission College, CA

Announcements

Request for Proposals: A Veterinary Internship/PhD Fellowship in Animal Welfare

The William and Charlotte Parks Foundation invites applications for:

- a) a one year internship in animal welfare for final year veterinary students or veterinary graduates at United States institutions; or
- b) a PhD Fellowship for students already enrolled in a PhD program at an accredited institution of higher learning in the US.

The successful candidate will receive a grant of \$30,000. For veteri-

nary interns, \$18,000 is identified for stipend and the remainder would be available for institutional and other expenses related to the proposed project. For PhD candidates, the award is meant to be a multi-year award providing three years stipendiary support (up to a maximum of \$24,000 for the three years) with the balance of up to \$6,000 being available for the costs of the research project and relevant institutional expenses.

Applications and information can be obtained from The William & Charlotte Parks Foundation for Animal Welfare, c/o Dr. Barbara Orlans, 7106 Lave-rock Lane, Bethesda, MD 20817. Deadline for applications is December 1, 1998. ❖

Call for Nominations: The 2000 Henry Pickering Bowditch Lecture

The annual Bowditch Lecture honors the first President of the American Physiological Society, Henry Pickering Bowditch.

The Lecturer is selected by the President with the consent of Council from among the regular members who have achieved outstanding work and are under 40 years of age at the time of presentation. The award is for original and outstanding accomplishments in the field of physiology. The award conveys an honorarium of \$2,500 plus travel and per diem expenses to attend the spring meeting, and the recipient is invited to submit a manuscript for publication in one of the Society's journals.

Nominations should be accompanied by letters from two nominators describing the importance of the candidate's work, a brief sketch of the nominee's professional history, papers or manuscripts that substantiate the excellence of the candidate, and a curriculum vitae.

Nominations should be submitted by **October 1** to: The APS Bowditch Lecture Award, 9650 Rockville Pike, Bethesda, MD 20814-3991. ❖

Call for Nominations: The 2000 Walter B. Cannon Memorial Lecture

The Cannon Memorial Lecture honors Walter B. Cannon, President of the Society from 1913-1916 and one of the century's most distinguished physiologists. The plenary lecture is presented annually by a distinguished physiological scientist, domestic or foreign, at the spring meeting on a subject that addresses some aspect of the concept of homeostasis as enunciated in Cannon's classic work, *The Wisdom of the Body*. The lecture, sponsored by the Grass Foundation, is selected by the APS President-elect with the consent of Council.

The recipient receives an honorarium of \$4,000 plus travel and per diem expenses and is invited to submit a manuscript for consideration of publication in one of the Society's journals.

Nominations for the Cannon Lecture Award should be documented to demonstrate the candidate's contributions to physiology. A curriculum vitae should accompany the letter of support describing the nominee's achievements. Submit nominations by **October 1** to: The APS Cannon Lecture Award, 9650 Rockville Pike, Bethesda, MD 20814-3991. ❖

Equipment Exchange

Quinton Rat Exercise Treadmill

I am looking to purchase a second-hand Quinton rat exercise treadmill. If there is a redundant treadmill stored away in your Department perhaps I can help clear some space. I will cover all costs of shipping.

Please contact Gerard Davis, Department of Physiology, University of Otago, PO Box 913, Dunedin, New Zealand (Tel: 64-3-479-7292; fax: 64-3-479-7323; e-mail: gerard.davis@stonebow.otago.ac.nz).

Chapter News

Iowa APS Chapter Annual Meeting Report

The third annual meeting of the Iowa Physiological Society (IPS) was held on April 24th and 25th at North Iowa Area Community College (NIACC) in Mason City, Iowa. The meeting was held in conjunction with the larger Iowa Academy of Science (IAS) Meeting. The IPS scientific sessions were held together with the physiology section of the IAS. This joint meeting has been beneficial to both groups in bringing together more Iowa physiologists than would ordinarily assemble at a single gathering. Research papers and papers on physiology teaching from throughout the state were presented in slide and poster formats. Topics ranged from an analysis of baroreceptor neural pathways in mice to ventilation of walleye fingerlings during transportation, as well as papers on computer-aided physiology instruction. There were several opportunities for poster viewing and meeting with presenters. The IAS sponsored a poster session on Friday afternoon during which IPS posters were displayed and manned. Following this session, the posters were moved to the site of our Saturday IPS scientific sessions.

Poster viewing took place before the morning slide presentations, during the luncheon buffet, and then again in a more formal poster discussion session in the afternoon following the keynote lecture. The "luncheon buffet," hosted by the IPS, has become a traditional feature of the meetings and is free to all presenters, friends, IPS members, IAS physiology section members, and the IAS board members. This luncheon has become quite a popular affair, during which participants meet informally and share ideas and information against the backdrop of the posters.

Following the luncheon, Gerald DiBona delivered the American Physiological Society Keynote Lecture, entitled "Neural control of renal function." His presentation was very well received, generating such comments as "great science," "very clear," and "wonderfully presented." The IPS thanks the APS for sponsoring this talk.

During the afternoon poster discussion session, each presenter spent 10 minutes or so discussing his or her poster and answering questions from the group. Those present then moved to the next poster and the process was repeated. This is the first time the poster discussion format has been tried, and preliminary reports are that it went well and should be repeated at next year's meeting. Before the morning slide presentations, the business meeting of the physiology section of the IAS was held. Following the morning slide presentations, the business meeting of the Iowa Physiological Society was held at which committee reports were heard and the new IPS president-elect was elected. Russell Rulon, PhD (Department of Biology, Luther College, Decorah, Iowa 52101-1045) is the new President of the Iowa Physiological Society. His e-mail address is rulonrus@luther.edu. The newly elected President-elect is Luke H. Mortensen, PhD (Physiology/Pharmacology, University of Osteopathic Medicine, Des Moines, Iowa 50312). His e-mail address is lmortens@uomhs.edu.

Complete details of this meeting are available at our website <http://www.faseb.org/aps/iowa.htm>. ❖

Don Stratton
Past President
Iowa Physiological Society
donald.stratton@drake.edu

1998 Research Career Enhancement Award

The Research Career Enhancement Awards are designed to enhance the research careers of APS members in good standing, strengthening their research programs and making them more competitive scientists. The awards are given competitively twice a year.

In 1998 the spring round of applications resulted in one application being accepted, that of **Meredith Bond**, Cleveland Clinic, Cleveland, OH.

Bond will use the award to attend a molecular biology course sponsored by New England Biolabs at Smith College. Bond will utilize the techniques learned during the course to enhance her research program which focuses on the area of downstream regulation of PKA-dependent substrate phosphorylation in the heart. ❖

G. Edgar Folk, Jr., Senior Physiologist Awards

The G. Edgar Folk, Jr., Senior Physiologist Fund has been set up through the generosity of family and former graduate students and postdoctoral fellows to provide modest but helpful assistance to senior physiologists, 70 years or older, who no longer have grant funds available to them. The awards, in the amount of \$500, might be used for such purposes as attending an APS meeting to present a paper, engaging in a series of modest experiments, or completing a manuscript (paying for typists or perhaps page charges). Recipients will be selected with the assistance of the Senior Physiologists Committee throughout the year. Names of awardees will not be made public. Mary Folk writes that the purpose of the fund is for the Senior Physiologists Committee "to have fun assisting colleagues and for Emeritus APS members to keep in closer touch with APS." ❖

APS Teaching Career Enhancement Awards

Statement of Purpose:

The APS Teaching Career Enhancement Awards are designed to enhance the career potential of regular members. The awards will provide up to \$4,000 to allow individuals to develop innovative and potentially widely applicable programs for teaching and learning physiology. The awards can be used to support short-term visits to other schools to consult with experts who can assist with the development project or attendance at special courses devoted to methodologies appropriate for the educational development project.

Application Procedure:

Candidates who are regular members in good standing may submit an application form including the following: 1) a two-page description of the proposed project, including the aim, the educational problem that the project is designed to ameliorate, identification of the innovative aspects, a plan to evaluate the educational outcomes, and the kinds and sources of expertise needed by the applicant to carry out the project; 2) an anticipated budget with justification for requested funds; 3) a letter of support from the applicant's department chair or other appropriate individual; 4) letters of agreement from individual or departmental hosts of schools to be visited; 5) description or outline of courses to be attended; and 6) a brief curriculum vitae focused on activities and achievements related to education.

Deadlines and Contact Information:

Deadlines: April 15 and October 15. Successful applicants are expected to report, in print or at a physiology conference, a description of the project and its evaluation. Awardees are encouraged to submit such reports for publication in *Advances in Physiology Education*. For an application form, please contact Martin Frank, Executive Director, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. Tel: 301-530-7118; fax: 301-571-8305; e-mail: awards@aps.faseb.org; Internet: <http://www.faseb.org/aps/awards.htm>.



Conferences

1998 APS Conference

Endothelial Regulation of Vascular Tone: Molecular to Integrative Physiology September 16–19, 1998 • Radisson Riverfront Hotel • Augusta, GA

ORGANIZER

David M. Pollock, Medical College of Georgia

ORGANIZING COMMITTEE

Jennifer S. Pollock, Medical College of Georgia

John D. Catravas, Medical College of Georgia

L. Gabriel Navar, Tulane University

Harris J. Granger, Texas A&M University

WEDNESDAY, September 16, 1998

DISCOVERY OF ENDOTHELIAL-DERIVED FACTORS

Endothelial-Derived Relaxing Factors

Salvador Moncada, University College, UK

Nitric Oxide and G-cyclase Activation

Ferid Murad, University of Texas at Houston

Endothelin

Masashi Yanagisawa, Howard Hughes Institute

Arachidonic Acid Metabolites

William B. Campbell, Medical College of Wisconsin

Endothelial-Derived Hyperpolarizing Factor

Rudi Busse, J. W. Goethe University, Germany

Mechanisms for Sustained Release of Vasodilators by Endothelium

Bradford C. Berk, University of Washington

THURSDAY, September 17, 1998

BASIC SCIENCE STATE OF THE ART

Role of Nitric Oxide in Vascular Disease

Louis J. Ignarro, University of California at Los Angeles

ACTIVATION AND SIGNAL TRANSDUCTION MECHANISMS

Effects of Acute and Chronic Shear Stress on Endothelial Function

Gabor Kaley, New York Medical College

Flow-Dependent Responses to the Vascular Endothelium

John A. Frangos, University of California at San Diego

Shear Stress Effects in the Glomerulus

Barbara J. Ballerman, Johns Hopkins University

Metabolic Control of Endothelial Cell Function

Richard J. Paul, University of Cincinnati

Protein-Protein Interaction in Endothelial Cell Caveolae

Richard C. Venema, Medical College of Georgia

Cell-Cell Communication

Brian Duling, University of Virginia

MOLECULAR AND GENETIC REGULATION

Transgenic Mice as Models for Hypertension

Edward G. Shesely, Henry Ford Hospital

Molecular Regulation of NOS-III

David G. Harrison, Emory University

Genetic Regulation of NOS II Induction

Ulrich Fürsternann, Gutenberg University, Germany

Special Lecture: *NO Synthase Isoforms*

Jennifer S. Pollock, Medical College of Georgia

FRIDAY, September 18, 1998

INTERACTION OF ENDOTHELIAL FACTORS

Relationship Between Nitric Acid and EDHF

Richard A. Cohen, Boston University

NO and Cytochrome P450: Vasodilation Independent of cGMP

Richard J. Roman, Medical College of Wisconsin

Endothelial Regulation of Arterial Pressure

Joey P. Granger, University of Mississippi

Kinin Regulation of Nitric Oxide Production

Thomas H. Hintze, New York Medical College

PULMONARY CIRCULATION

Regulation of Endothelium-Bound Angiotensin Converting Enzyme

John D. Catravas, Medical College of Georgia

Pulmonary Circulation

Philip J. Kadowitz, Tulane University

Role of ET in the Developing Lung

Steven H. Abman, University of Colorado

RENAL CIRCULATION

Angiotensin-Nitric Oxide Interactions in the Kidney

L. Gabriel Navar, Tulane University

Mechanisms of Angiotensin and Prostaglandin Action

in the Renal Microcirculation

William J. Arendshorst, University of North Carolina

Nitric Oxide in the Macula Densa and Afferent Arteriole

Christopher S. Wilcox, Georgetown University

Endothelin-Nitric Oxide Interactions in the Kidney

David M. Pollock, Medical College of Georgia

Special Lecture: *Peptidases in the Vascular Endothelium*

James W. Ryan, Medical College of Georgia

SATURDAY, September 19, 1998

CLINICAL SCIENCE STATE OF THE ART

Pivotal Role of Endothelium to Heart-Lung Transplantation

Sir Magdi Yacoub, Imperial College, London

CORONARY CIRCULATION

Endothelial Regulation in Cardiomyopathy

Leslie C. Fuchs, Medical College of Georgia

Estrogen Modulation of the Vascular Endothelium: Implications for

Development of Coronary Artery Disease

Virginia M. Miller, Mayo Clinic

Effect of Exercise on Endothelial Function

M. Harold Laughlin, University of Missouri

ENDOTHELIUM AND DIABETES

Endothelial Dysfunction in Diabetes

Galen M. Pieper, Medical College of Wisconsin

Endothelial Regulation of the Renal Microcirculation in Diabetes

Pamela K. Carmines, University of Nebraska

Novel Therapeutic Approaches to the Treatment of Diabetes

Joan A. Keiser, Parke-Davis

RESPONSE TO INJURY

Endothelin in Vascular Disease

Terry J. Opgenorth, Abbott Laboratories

Endothelial Regulation of Angiogenesis

Harris J. Granger, Texas A&M University

Endothelial Cell Gene Expression in Response to Injury

Mary E. Gerritsen, Bayer

TGF- β in Fibrotic Disease

Wayne A. Border, University of Utah

Activation of Endothelial Stress Genes

Bruce R. Pitt, University of Pittsburgh

Conferences

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

ORGANIZER:

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University of Texas Health Sciences Center at San Antonio

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University of Groningen, The Netherlands

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

TENTATIVE PROGRAM

Anatomy, Neural Pathways, and Neurochemistry
Arthur Loewy, Washington University; **Paul Sawchenko**, Salk Institute; **Larry Swanson**, University of Southern California

Integration of Ingestive Behaviors
Alan K. Johnson, University of Iowa; **Glenn Stanley**, University of California at Riverside; **Stephen Woods**, University of Washington; **Joseph Verbalis**, Georgetown University; **Gaylen Edwards**, University of Georgia; **David York**, Pennington Biomedical Research Center.

Role in Metabolism and Energy Balance
Anton J. W. Scheurink, University of Groningen, The Netherlands; **Barry Levin**, Veterans Affairs Medical Center, East Orange, NJ; **Gertjan van Dijk**, University of Groningen, The Netherlands; **Martine Orosco**, University of Paris; **Mary Dallman**, University of California at San Francisco; **Denis Richard**, Laval University.

Neuroendocrine Regulation
Leo P. Renaud, University of Ottawa; **Ruud Buijs**, Netherlands Institute of Brain Research; **Charles Bourque**, McGill University; **William Crowley**, University of Tennessee at Memphis; **Paul Plotsky**, Emory University

Stress and the Immune System
Catherine Rivier, Salk Institute; **Serge Rivest**, Laval University; **Tom McDonald**, Cornell University; **Dwight Nance**, University of Manitoba; **Adrian Dunn**, Louisiana State University; **James Herman**, University of Kentucky

Cardiovascular-Regulation
Joseph R. Haywood, University of Texas Health Sciences Center at San Antonio; **Steven Bealer**, University of Tennessee at Memphis; **Quentin Pittman**, University of Calgary; **Mariana Morris**, Wright State University; **Kaushik Patel**, University of Nebraska; **Alastair Ferguson**, Queens University

APS Conference Deadlines

**Endothelial Regulation of Vascular Tone:
Molecular to Integrative Physiology**
Early Registration Deadline: August 14, 1998

**The Paraventricular Nucleus of the Hypothalamus:
A Crossroads of Integrative Physiology**
Early Registration Deadline: October 19, 1998

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Advances in Physiology Education

Coming Soon

Physiological Reviews
News in Physiological Sciences

Three Additional Societies Join Biomedical Research Foundation

Three more societies joined FASEB in May, bringing its total membership to 17 societies representing over 56,000 scientists.

At its May 5 meeting, the FASEB Board approved an application for full membership from the American Society for Clinical Investigation (ASCI) and applications for associate membership from the Society for the Study of Reproduction and the Teratology Society. This brings the number of full member societies to 12 and the number of associate member societies to 5. FASEB scientists conduct biomedical and biological research in university, corporate, and government laboratories across the country.

On May 1, 1998, the ASCI Council unanimously voted to join the Federation. The ASCI is one of North America's premier organizations of physician-scientists and is comprised of 2,600 physician-scientists from all medical specialties. The ASCI is dedicated to the advancement of scientific research that pertains to the understanding and treatment of human diseases, and is committed to the mentoring of future generations of physician-scientists.

Members are elected to the ASCI in recognition of an outstanding record of scholarly achievement in biomedical research accomplished relatively early in a scientific career. In the course of its 90 year history, more than 120 members of the ASCI have been elected to the National Academy of Sciences, 26 won the Lasker Award, and 14 won the Nobel Prize. One of the ASCI's major scholarly functions is publication of the *Journal of Clinical Investigation*.

Announcing the affiliation with FASEB, ASCI President Ajit Varki

noted that the ASCI had just concluded an internal dialogue resulting in a decision to become involved in advocacy for biomedical research. "To do this in co-operation with the member societies of FASEB ensures that the voice of the ASCI, with its unique perspective from established physician-scientists, will be heard clearly and effectively, while meshing smoothly with that of other biomedical scientists with whom we have so much in common," Varki said.

The Society for the Study of Reproduction and the Teratology Society are the newest associate members of the Federation, bringing the number of societies in this category to five. Associate membership provides smaller societies the opportunity to participate in FASEB public affairs activities and to advise FASEB on the particular concerns of investigators in highly specialized areas or in newly developing disciplines.

The Society for the Study of Reproduction (SSR) was founded in 1967, to promote the study of reproduction by fostering interdisciplinary communication among scientists, holding conferences, and publishing meritorious studies. Its members are basic scientists, medical and veterinary physicians, trainees in graduate and professional schools, and others engaged in research, education, and training in fields relevant to reproductive biology. Members are affiliated with college and universities, medical and veterinary schools, medical centers, research institutes, government agencies, and industry in some forty-seven countries.

The 1,529 members of the Society for the Study of Reproduction perform research on important problems in human and animal reproduction

relating to medicine, agriculture, and basic biology. These include infertility, contraception, pregnancy-related disorders, diseases of the reproductive tract, reproductive toxicology, lactation, reproduction and conservation of endangered species, basic mechanisms controlling the function of organs involved in reproduction, and mechanisms of cell differentiation and development. *Biology of Reproduction*, the official journal of the SSR, publishes original, peer-refereed scientific papers and is ranked as the top journal in the field of reproductive science.

The Teratology Society was established in 1960 to foster exchange of information relating to congenital (birth) defects including their nature, cause, mechanism and prevention. The society has over 750 members drawn from a wide range of scientific fields including pediatrics, anatomy, epidemiology, pharmacology and industrial toxicology, developmental biology, obstetrics, pathology, genetics and dentistry. *Teratology: The Journal of Abnormal Development* is the official journal of the society.

The mission of the Teratology Society is to promote research and the exchange of ideas and research results that reveal the causes, improve the diagnosis and treatment, and prevent the occurrence of abnormal development and birth defects; to communicate that information to physicians, public health officials, concerned health advocacy and lay groups and other interested parties that promote the elimination of birth defects when possible and amelioration of them when they occur; and to provide education and training on the causes, mechanisms, treatment and prevention of birth defects. ❖

Public Affairs

Congress Debates Budget, Tobacco

As Congress moved closer to its Memorial Day recess, there was legislative activity on several issues important to NIH funding.

Each year's budget cycle has its own particular quirks. The stumbling block thus far in the FY 1999 cycle has been whether to keep pursuing fiscal austerity when the budget deficit seems to be disappearing more quickly than expected. The other special feature this year has been the possibility that tobacco legislation might provide additional resources for NIH.

Federal spending each year is determined by a two-stage process: First Congress passes a budget resolution outlining what revenues are anticipated and how much the government should spend overall in broad categories such as "health," "education," and "defense." The action then transfers to the House and Senate Appropriations Committees, which draft 13 appropriations bills setting specific spending levels for each government agency.

For more than a decade, concern over reducing the deficit produced a series of plans to balance the budget. The latest such plan was adopted last year. This year, due to preliminary reports that we may actually see a surplus, there has been some confusion in the ranks. Some in Washington want to spend the all or part of the surplus, and some would like to stick with this year's planned spending limitations, or even exceed them. There are also differences of opinion over where any new spending should go, although biomed-

ical research funding has been at or near the top of most priority lists.

The statutory May 15 deadline for completing action on the budget resolution passed without approval of a final plan. The Senate had passed its version of the budget, which assumed an 11 percent increase in NIH funding. However, NIH's gain came at the expense of other health programs. Using the Senate budget plan, the Senate Appropriations Committee mapped out how much money would be available to its 13 subcommittees. The results were grim, with funding levels for the Labor-HHS-Education Subcommittee (which funds NIH) and the VA-HUD Subcommittee (which funds NSF, the VA, and NASA) below the levels contained in the President's budget request.

As of May 15, the House Budget Committee had not drafted its plan. Chairman John Kasich (R-OH) made clear his intention to go cut spending below the spending limits set in last year's budget agreement. However, he faced opposition from both Republicans and Democrats to this draconian approach. Despite his overall fiscal toughness, a leaked document containing Kasich's "short list" of spending priorities included an 8 percent funding increase for NIH even as most other government programs were to be frozen at this year's levels or even cut.

Kasich was expected to offer instead a simplified budget plan calling for a total of \$100 billion in cuts but without specifying where they would be made. However, if that effort stalled, the House might instead pass a special

resolution that permitting the House Appropriations Committee to proceed with its work using the FY 1999 budget caps contained in last year's plan even in the absence of a budget resolution.

The problem remains that if Congress is forced to operate under the current "official" budget assumptions it will not have enough funds for Congress to produce politically viable appropriations bills for FY 1999 given the rising expectations that the budget will soon be balanced or in surplus. If this proves to be the case, Congress may delay action on the major spending bills until new budget projections are released later this summer in the hope that a better fiscal outlook will make it possible to revise the FY 1999 spending levels currently in effect.

The other important event was the possibility of tobacco legislation as a federal addendum to the settlement reached last year by the state attorneys general and the tobacco industry. The House has so far balked at producing a bill, but Senate legislation sponsored by Sen. John McCain (R-AZ) was scheduled to go to Senate floor shortly before the Memorial Day recess. The McCain bill was expected to set aside \$2.5 billion for each of the next 10 years from funds generated for NIH research. However, last-minute concerns included whether an attempt would be made to restrict the money to tobacco-related illnesses, and whether there would be language ensuring that the tobacco monies could be used only to supplement and not to replace the regular NIH appropriation.

Have you checked out the APS Public Affairs Web Page lately?

Point your web browser to <http://www.faseb.org/aps/pahome.htm> and check out the latest version. We look forward to your feedback and questions! Just send an e-mail to paffair@aps.faseb.org.

Public Affairs

HSUS to Ask for New USDA Pain Reports

Andrew Rowan of the Humane Society of the United States told a national meeting on animal care issues that the HSUS will seek to eliminate pain and distress in laboratory animals by the year 2020. The Applied Research Ethics National Association (ARENA) and Public Responsibility in Medicine and Research (PRIM&R) hold back-to-back conferences each spring to explore issues related to the humane care of animals in research.

The goal of the HSUS campaign can be seen as an effort to implement the third of the “three R’s” — refinement, which is already accepted public policy through the Animal Welfare Act. However, there is the critical question, how will the goal be achieved.

At the ARENA and PRIM&R meetings Rowan also announced his intention to seek a revision of USDA’s pain and distress reporting categories. This proposal, which has been circulating for two years, poses a number of serious questions. A survey on the proposal has been distributed to represen-

tatives of 46 institutions who attended the conference.

The current reporting system requires institutions to report how many animals in each regulated species were used in potentially painful procedures. The categories are no pain or distress, pain or distress that was relieved by drugs, or unrelieved pain or distress.

APS Animal Care and Experimentation Committee Chairman C. Terrance Hawk PhD, DVM, participated two years ago in a task force convened by Rowan, who was then the head of the Tufts Center for Animals and Public Policy. Given the generalized dissatisfaction within both the research and the animal activist communities with the existing reporting scheme, Rowan sought to define a new scheme that all would support. However, even at the time, Hawk expressed reservations about Rowan’s proposal to place more emphasis on distress and to revise the categories, adding a fourth.

The proposed categories are: little or no pain or distress without pain

relieving drugs, little or no pain or distress with the use of pain relieving drugs, moderate pain or distress even if appropriate drugs were used during at least part of the procedure, and severe pain or distress even if appropriate drugs were used in at least part of the procedure.

The problem with this approach is that it would make the reporting process more cumbersome without improving the accuracy of the data. Trying to classify an animal’s experience of pain in response to a procedure is largely subjective, and animal care and use committees at different institutions make different judgments about categorizing them. These legitimate differences in judgment would exist even if the same person were performing the same procedure in each case. This has to do with the autonomy that is granted to animal care committees and is not something to be “fixed” by adding new reporting categories or mandating that procedures be assigned to certain categories. ❖

APS, FASEB, Seek More Fair Animal Cost Rules

As part of an ongoing effort to ensure equitable treatment of animal research costs, APS is playing an active role in a FASEB-led effort to revise the federal Office of Management and Budget’s (OMB) interpretation of Circular A-21. APS Public Affairs Committee Chairman J.R. Haywood was asked in March to chair a special subcommittee of FASEB’s Public Affairs Advisory Committee (PAAC) on the animal research facilities cost issue. Haywood’s predecessor, Eric Feigl, had previously spearheaded FASEB efforts on this issue.

The Subcommittee’s first task was to evaluate a proposal by an ad hoc NIH task force that OMB should allow certain animal research facility costs to be included in institutional Facilities and

Administrative (indirect) costs.

FASEB has long taken the position that animal research costs should be treated in the same way as costs for comparable kinds of research. Specifically, the FASEB position states that purchase, daily husbandry, and research procedures should be direct costs, while costs related to complying with federal regulations and operating the animal research facility should be treated as overhead. The latter should be allocated to the institution’s Facilities and Administrative (F&A) costs.

In recent years, OMB has sought to keep indirect cost rates down by forcing institutions to charge all animal research costs directly to investigators through per diem rates. OMB’s rationale was that animal facilities should be

treated as “specialized research facilities,” a category that also includes wind tunnels and nuclear reactors. Although it is not yet uniformly in force, this policy is widely seen as likely to cause serious disruptions to some kinds of research as per diem rates skyrocket.

The APS and FASEB position asserts that animal research facilities are comparable not to nuclear reactors but to other biomedical science laboratories, and costs should be split between direct and indirect costs in a similar fashion.

Consequently, the FASEB subcommittee concluded that the task force’s proposal did not go far enough to solve the problem. ❖

Web News

Web Surfing: Don't Get Pulled in to an Addiction

You're sitting at your desk in between meetings, with a few minutes to spare. What are you thinking about right now? An upcoming conference, a fascinating article from the latest edition of *The Physiologist*, or maybe checking out what's new on the Web. The computer is right there, after all, ready to give you access to a world of information, entertainment and distraction. You've used the Internet and World Wide Web to buy a car, purchase discount airfare, plan a vacation, and check out the latest albums. But how much time are you spending surfing the Web, and how much of that is productive time?

Recently, a new form of addictive behavior disorder has been described--Internet Addiction. Much in the same way that others become addicted to drugs, alcohol, or gambling, it is now being suggested that some individuals may be susceptible to compulsive Web surfing.

With the popularity and wide-spread access to the Internet and the World Wide Web, it's a topic worth considering. For the purposes of this article, I consulted several Web sites looking for criteria for a definition of Internet Addiction. Not an easy task. As a relatively new topic of study, there wasn't much empirical data available. However, one item I found did seem to serve as an effective diagnostic tool for the assessment of one's degree of compulsion with the Internet. The following questionnaire was found at the Web site for The Center for Online Addiction (COLA), an on-line counseling, consultation, and training institute for Internet addiction. <http://netaddiction.com/articles/newdisorder.html>

1. Do you feel preoccupied with the Internet (think about previous on-line activity or anticipate next on-line session)?
2. Do you feel the need to use the Internet with increasing amounts of time in order to achieve satisfaction?
3. Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use?

4. Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?

5. Do you stay on-line longer than originally intended?

6. Have you jeopardized or risked the loss of significant relationship, job, educational or career opportunity because of the Internet?

7. Have you lied to family members, therapist, or others to conceal the extent of involvement with the Internet?

8. Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)?

If you answered "yes" to five or more of the criteria, than you may fit COLA's classification of an addicted Internet user. It should be noted that the cut off score of "five" was consistent with the number of criteria used for Pathological Gambling. Also, the term Internet referred to all types of Online activity. (The Web, Chat Rooms, Bulletin Boards, E-mail, etc.)

If you would like more information on Internet Addiction, please see the following web sites.

- Internet Behavior and Addiction, Institute for Hygiene and Applied Physiology, Swiss Federal Institute of Technology, Zurich <http://www.ifap.bep.ETHZ.ch/~egger/ibq/res.htm>
- Psychological Internet Addiction Study, which is designed to test the stereotype of addicted individuals. <http://147.197.152.160/netquest/ALL-VER6.html> and
- Clicking the Night Away, which is a study to find out what users in Malta are utilizing the Internet for and what subsequent gratifications are obtained from such use. <http://oberonlabs.com/dabela/>

As always, if you have a question, or suggestion that you would like to see addressed in this column, please submit it via email to webmaster@aps.faseb.org. Happy Surfing! ❖

Announcements

Charles E. Culpeper Foundation Scholarships in Medical Science

The Charles E. Culpeper Foundation is currently accepting applications for its 1999 Scholarships in Medical Science Program designed to support the career development of academic physicians.

Up to four awards of \$100,000 per year for three years will be made to US medical schools on behalf of the candidates who are US citizens or aliens who have been granted permanent US residence (proof required), have received their MD degree from a US medical school in 1990 or later (except by extraordinary circumstances), and are judged worthy of support by virtue of the quality of their research proposals. All scientific research relevant to human health is eligible for consideration. No institution may nominate more than one candidate. In selecting awardees, emphasis will be on identifying young physicians with clear potential for making substantial contributions to science as academic physicians. Since January 1988, 33 physicians have been selected as Charles E. Culpeper Foundation Medical Scholars.

Deadline for applications is August 14, 1998. Awards will be announced in January 1999, for activation on or about July 1, 1999. Application forms and instructions may be obtained on the Web at www.culpeper.org or by contacting the Charles E. Culpeper Foundation at Financial Centre, 695 East Main Street, Stamford, CT 069041-2155 (telephone, 203-975-1240; fax, 203-975-1847). ❖

Education

New Outreach Teams Named for 1998-1999

Three new Local Outreach Teams (LOTs) have been named by Council to conduct professional development workshops for middle and high school teachers within their local communities. The new LOTs and their team leaders are: University of Arkansas for Medical Sciences in Little Rock, led by Michael L. Jennings; University of North Carolina in Chapel Hill, led by Marianne L. Meeker; and, Texas Tech University Health Sciences Center in Lubbock, led by Lorenz O. Lutherer.

The workshops enable teachers to explore hands-on, inquiry-based physiological activities in neural and exercise physiology. Each LOT is chaired by an APS physiologist who works with other physiologists, and local science teachers and science education administrators to present these activities to their middle and high school colleagues.

The 1998-99 LOTs join a network of 19 APS outreach teams in 12 states that have delivered these physiology training materials to more than 400 science teachers nationwide over the past three years.

Members from each new LOT will attend an Outreach Institute, June 25-28 in Warrenton, VA, to learn the content and pedagogy within the workshop modules. Past LOT members will model for new members the use of the "Neural Networks" and "Physiology of Fitness" activities. The "Neural Networks" workshop, which is directed toward middle school teachers, explores anatomy and physiology of reflexes and reactions. The "Physiology of Fitness" workshop for high school teachers, focuses on exercise physiology related to cardiovascular and respiratory systems.

Each LOT will conduct a one- to two-day workshop for 20-30 local science teachers in the fall of 1998. There will be shorter follow-up sessions in the winter and spring which may include sharing strategies for using the workshop materials in class; Internet exploration, and/or tours of the research facilities where the APS members work.

For information on the new LOTs or on establishing an LOT in your community, contact Marsha Lakes Matyas, Education Officer, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. Tel: 301-530-7132; fax: 301-571-8305; e-mail: educatio@aps.faseb.org, or look at the APS Web page at: <http://www.faseb.org/aps/educatn/lot.htm>. ❖

Volunteer! Become A Contact for a Summer Research Teacher

The APS Education Office invites you to volunteer to serve as a contact and/or research host for a middle or high school science teacher, or a 2- or 4-year college faculty member who is interested in doing physiology research in a laboratory during the summer of 1999.

APS contact persons are needed for three programs, *Frontiers in Physiology*, for middle and high school teachers; *Physiology Insights*, for faculty members at 2- and 4-year colleges who teach physiology, but whose background may not be in physiology; and, *Explorations in Biomedicine*, a program specifically for teachers in Montana who teach primarily Native American students. While participants in the *Frontiers* and *Physiology Insights* programs work

with researchers within 75 miles of their home communities, *Explorations* teachers may work with researchers anywhere in the United States.

Contact persons provide a first point of contact for teachers or college faculty interested in participating in one of the APS Summer Science Research Programs. By talking with teachers or local college faculty, the contact can determine their research interests and backgrounds, and guide them to other APS members who are interested and able to serve as host researchers. Of course, contact persons often decide to host teachers in their own laboratories.

Applications for the 1999 Summer Research Programs will be distributed in September 1998. Queries from teachers and faculty members can be

expected from September through December 1998. The deadline for 1999 applications will be January 5, 1999.

To check if you're on the current list of APS contact persons, visit our Web site at: <http://www.faseb.org/aps/educatn/98contac.htm>. If you are interested in being a contact person and/or research host for our 1999 programs, or would like more information, please notify Marsha Lakes Matyas, Education Officer, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. Tel: 301-530-7132; fax: 301-571-8305; email: educatio@aps.faseb.org. Please be sure to include your mailing address as well as your email address. ❖

New Teacher Developed Activities on the APS Education Web Page

Point your browser to:

<http://www.faseb.org/aps/educatn/frontact.htm>

Position Wanted

Position Wanted. PhD in Physiology 1985. Cardiovascular-gastrointestinal physiologist, with experience in lipid mediator biochemistry and inflammation-transplantation biology. Significant track record of extramural funding. Seeks an academic/industrial position. Can bring full laboratory equipment and supplies. Postdoctoral experience and faculty position at Washington University School of Medicine at St. Louis. Teaching responsibilities are welcome. If interested, please e-mail mjmangino@hotmail.com or call pager 305-543-1843 and leave your phone number.

Positions Available

Postdoctoral Position. Investigate signal transduction mechanisms involved in the regulation of intracellular Ca^{2+} concentration in arterial smooth muscle cells by vasoactive hormones. The project will utilize multiple experimental approaches involving fluorescence imaging, patch-clamp electrophysiology, and molecular and biochemical techniques. New, state-of-the-art facilities and a very congenial working atmosphere. Send cover letter, Curriculum Vitae, and three letters of reference to Kenneth L. Byron, PhD, Loyola University Chicago, 2160 South First Ave., Maywood, IL 60153.

Postdoctoral Position. Available immediately to study ion channel mechanisms of cardiac arrhythmia, with focus on long QT syndrome and idiopathic ventricular fibrillation. Ph.D. in physiology or related field required. Background in patch-clamp electrophysiology and/or molecular biology experience desirable. Send curriculum vitae and names of three references to: Glenn E. Kirsch, PhD, MetroHealth Medical Center, Rammelkamp Building R327, 2500 MetroHealth Drive, Cleveland OH 44109-1998 (e-mail: gek3@po.cwru.edu; fax: 216-778-8282; telephone: 216-778-8968). MetroHealth is an affiliate of Case Western Reserve University.

Postdoctoral Fellow or Research Associate. There is an immediate opening for a postdoctoral fellow (or a research associate) in the Departments of Medicine (Renal Division) and Physiology under the supervision of Drs. Sands, Timmer, and Gunn. The position is funded by an NIH Program Project Grant entitled "Cellular and Molecular Biology of Renal Transport Processes- Project 2: The Structure and Functions of Urea Transporters." The research emphasis will be on functional measurements of urea, water, and phosphate transport in isolated perfused kidney tubules and urea fluxes in cultured cells. The candidate will also be trained in molecular biological techniques including cell transfection and Western and Northern blotting so that mechanism(s) for functional changes can be explored at the protein and mRNA levels. Candidates with experience in isolated perfused tubule or micropuncture studies are strongly encouraged to apply, regardless of degree. Please contact Jeff Sands, MD, Emory University, Renal Division, WMRB Room 338, 1639 Pierce Drive, NE, Atlanta, GA (tel: 404-727-2435; fax: 404-727-3425; e-mail: jsands@emory.edu).

Postdoctoral Position in Vascular Biology. The Department of Physiology at Jefferson Medical College, Thomas Jefferson University, offers a postdoctoral training program in physiology and pathophysiology of cardiovascular disorders. Current research areas for this position include mechanisms of myocardial ischemia-reperfusion injury, endothelial mediators in the regulation of endothelial cell function, nitric oxide physiology, neutrophil migration, and the role of adhesion molecules in the interaction of leukocytes and endothelial cells in circulatory disorders. Emphasis will be placed on cellular and molecular approaches to these problems. Candidates must be US citizens or hold permanent resident alien status. Interested candidates are invited to apply to Allan M. Lefer, PhD, Professor and Chairman, Department of Physiology, Jefferson Medical College, 1020 Locust Street, Philadelphia, PA 19107-6799. [EO/AEE]

Chair of Physiology. The Medical College of Georgia invites applications and nominations for the position of Chair of the Department of Physiology and Endocrinology in the School of Medicine. The department has a distinguished history of academic and research achievement, and the new chair will have the opportunity and resources to adopt a leadership role in defining the future course and development of the department. The candidate must have a national reputation for excellence in scholarship, teaching, and research and have demonstrated expertise in guiding the independent research efforts of younger scientists. The candidate is expected to hold a PhD and/or MD degree with expertise in physiology or a closely related field. The department currently has 14 full-time faculty members, 12 graduate students, and 19 full-time staff members. Faculty members are actively engaged in diverse research programs and collaborative projects with other basic science and clinical departments. The faculty is responsible for teaching courses to medical, graduate, and allied health students. Interested candidates should send a curriculum vitae to Dr. Sylvia B. Smith, Chair of the Search Committee for the Chair of the Department of Physiology and Endocrinology, c/o Dean's Office, School of Medicine, AA-152, Medical College of Georgia, Augusta, GA 30912-4750. The Medical College of Georgia is committed to diversity in its faculty and students. Women and minorities are encouraged to apply.

Positions Available

Postdoctoral Positions in Cardiovascular Research. Positions are available with a number of preceptors in areas of cardiovascular research that include molecular and cell biology: neuroendocrinology, pharmacology, physiology, and pathophysiology. Requirements include a PhD, MD, or DVM and US citizenship or permanent residence (NIH Training Grant). Interested candidates should contact Leonard Share (lshare@physio1.utmem.edu), Charles Leffler (cleffler@physio1.utmem.edu), or K. U. Malik (kmalik@physio1.utmem.edu) and/or send their curriculum vitae and three reference names to Leonard Share, PhD, Department of Physiology and Biophysics, 894 Union Avenue, University of Tennessee, Memphis, TN 38163. The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA employer.

Associate Research Scientist. (#39173). The University of Iowa College of Medicine, Department of Internal Medicine, Nephrology Division, is seeking an Associate Research Scientist to perform research in an area of membrane transport proteins. The person will identify and select the problems to be studied, develop an approach to them, conduct the measurements, interpret the data, and present the results. A person in this classification has the academic knowledge of a discipline that is generally associated with a doctoral degree or an equivalent combination of education and experience. In addition, the person will have demonstrated the ability to plan and execute a research study through some progressively responsible independent research work. Such a person will have submitted an application for funding that has been funded or has a reasonable chance of being funded. Obtaining outside funds for all or a portion of his/her salary will be an expectation. Considerable (3-5 years) experience with molecular methods used in studying the biology of membranes and/or membrane transport processes is required. Experience with molecular biology and molecular methods used in the biology of ion channels and/or membrane proteins is desirable. Please send resume and cover letter indicating #39173/Associate Research Scientist to Carol Wehby, Human Resources, Internal Medicine, E400 GH, 200 Hawkins Drive, Iowa City, IA 52242-1081. Women and minorities are strongly encouraged to apply. [EO/AEE]

Postdoctoral Position. A 2.5-year position is available to study the mechanisms of membrane targeting and second messenger pathways regulating renal sulfate transporters (Markovich et al., *Proc. Natl. Acad. Sci.*90: 8073-8077, 1993). Applicants must have good skills in molecular/cell biology and tissue culture experience, including site-directed mutagenesis, protein routing and targeting, immunofluorescence, and antibody production. Annual salary range is A\$41,481-44,527. Please send a curriculum vitae, list of techniques, research interests, and names of two references to Daniel Markovich, PhD, Department of Physiology and Pharmacology, University of Queensland, Brisbane 4072, Australia (tel: +61-7-3365-1400; fax: +61-7-3365-1766; e-mail: danielm@plpk.uq.edu.au..

Postdoctoral Position. To study the role of the sensory nerve Ca^{2+} receptor (Bukoski et al. *Hypertension* 30: 1431-1439, 1997) in the regulation of vascular reactivity and blood pressure. A variety of projects ranging from delineation of the cannabinoid vasodilator transmitter pathway that mediates Ca^{2+} -induced dilation, to neuronal cell signaling pathways coupling the Ca^{2+} receptor with transmitter release, to the use of the Ca^{2+} receptor as a molecular target for novel anti-hypertensive drug development are ongoing in the laboratory. Applicants should have training in vascular or neuronal cell/molecular physiology and a eagerness to excel in a multidisciplinary environment. The University of Texas Medical Branch is the oldest biomedical research and healthcare facility in Texas and is located on Galveston Island, which is a major tourist destination that offers recreation opportunities unique to the Gulf Coast. Please send curriculum vitae and three letters of reference to: Richard D. Bukoski, Ph.D., Director: Section of Hypertension and Vascular Research, 8.104 Medical Research Building, University of Texas Medical Branch, Galveston, TX 77555-1065; fax: 409-747-1861; e-mail: rbukoski@utmb.edu. [EOE/AA]

Postdoctoral position. Available immediately at the Division of Nephrology, University of Texas Medical Branch, to study the function and regulation of P-glycoprotein (multidrug resistance transporter) in kidney cells. Recent PhDs in cell/molecular biology are encouraged to apply. NIH funding. Send curriculum vitae to: E. Bello-Reuss, PhD, University of Texas Medical Branch, 301 University Blvd., 4200 John Sealy Annex, Galveston, TX 77555-0562; e-mail: ebellore@utmb.edu.

Postdoctoral Fellowship. The Obesity and Diabetes Research Center of the University of Maryland School of Medicine has a postdoctoral position available in the areas of mechanisms of obesity, diabetes, and aging. NIH- and industry-funded projects include the early physiological/molecular development of diabetes and aging; metabolic, enzymatic, and insulin signaling alterations in calorie restriction and aging; prevention of diabetes and its complications, retinopathy, nephropathy, and dyslipidemia; pancreatic islet culture and transplant; and molecular aspects of diabetes and obesity. Doctorate in physiology, molecular or cell biology, or biochemistry with interest in integrating in vivo and in vitro studies required. Start date approximately July 1998. Send curriculum vitae; outline of research experience and interests; and names, addresses, and telephone numbers of three references to B. C. Hansen, Director, Obesity and Diabetes Research Center, Department of Physiology, University of Maryland, School of Medicine, 10 South Pine Street, #6-00 MSTF, Baltimore, MD 21201. Fax: 410-706-7450; e-mail: bchansen@aol.com.

People and Places

Jin Hyuk Kim has accepted a position as Research Associate, University of Pittsburgh, Department of Neuroscience, Pittsburgh, PA. Previously, Kim was associated with the Hanyang University College of Medicine, Department of Physiology, Seoul, Korea.

Previously, **Michael Kurz** was a research scientist with Gensia Pharmaceuticals, San Diego, CA. Kurz is now a Clinical Information Scientist with Centocor, Inc., Medical Affairs, San Marcos, CA.

Peter W. R. Lemon has left the Applied Physiology Research Laboratory of Kent State University, Kent, OH, and has joined The University of Western Ontario, London, Ontario, Canada, Faculties of Health Sciences and Medicine, as Professor and Weider Chair of Exercise Nutrition.

Having accepted a position as Vice Provost for Research, Oregon Health Sciences University, Portland, OR, **Manuel Martinez-Maldonado** has left the Department of Medicine, Atlanta Department of Veterans Administration, Emory University School of Medicine, Decatur, GA.

Leaving Simon Fraser University, School of Kinesiology, Burnaby, BC, Canada, **Louis Martineau** has joined the Neuromuscular Plasticity Laboratory, CEPSUM, Universite De Montreal, Montreal, QC, Canada.

Deceased Members

Mathew Alpern
Ann Arbor, MI
Vicki L. Schechtman
Los Angeles, CA
Jack D. Meyers
Pittsburgh, PA
Michael E. Burt
New York, NY
Robert C. Darling
Wilmington, DE

Jane E. McGowan has accepted a position as Associate Professor, Allegheny University Hospitals, MCP Division, Department of Pediatrics, Philadelphia, PA. Prior to her new position, McGowan was affiliated with the Department of Pediatrics, University of Pennsylvania, Philadelphia, PA.

Accepting a position with Design Write, Inc., Princeton, NJ, as a Medical Writer, **Karen D. Mittleman**, is no longer connected with Rutgers University, Exercise Science and Sports Studies, New Brunswick, NJ.

Dina Nicole Paltoo is now affiliated with the Department of Physiology & Biophysics, Howard University College of Medicine, Washington, DC. Formerly, Paltoo was a Postdoctoral Research Fellow, Department of Molecular Biology, University of Medicine and Dentistry, School of Osteopathic Medicine, Stratford, NJ.

Jørgen Søberg Petersen is currently affiliated with the Department of Safety Pharmacology, H. Lundbeck Pharmaceuticals, Valby, Denmark. Preceding his new position, Petersen was associated with the Department of Pharmacology, the University of Copenhagen, Panum Institute, Copenhagen, Denmark.

Accepting a position as Senior Research Scientist with Alliance Pharmaceutical Corporation, Department of Experimental Biology, San Diego, CA, **Michael Samardzija** subsequently has left the Department of Pharmacology, University of California, San Diego, La Jolla, CA.

Akira Takahashi is presently a Research Associate with the Yamaguchi University School of Medicine, Department of Internal Medicine, Yamaguchi, Japan. Prior to his new position, Takahashi was a Research Associate with the Department of Cell Biology/Physiology, University of Pittsburgh School of Medicine, Pittsburgh, PA.

Carol E. Torgan was formerly with the Department of Medicine, Duke University Medical Center, Durham, NC. Currently, Torgan has joined the National Institutes of Health as a Research Associate of the National Heart, Lung, and Blood Institute, Laboratory of Biochemical Genetics, Bethesda, MD.

Recently, **Lid Bun Wong**, Associate Professor, has joined the CTP Research Center, Chicago, IL. Formerly, Wong was affiliated with the Department of Medicine, University of Illinois, Chicago, IL.

Naohide Yamashita is presently affiliated with the University of Tokyo, the Institute of Medical Science, Department of Advanced Medical Science, Tokyo, Japan. Previously, Yamashita was with the Tokyo University Branch Hospital, Fourth Department of Internal Medicine, Tokyo, Japan.

Having moved from the Department of Physiology & Biophysics, University of Nebraska Medical Center, Omaha, NE, **Kun Zhang** is presently with the Department of Pharmacology, University of Texas Health Science Center, San Antonio, TX.

Correction

Reza Shaker was incorrectly listed in *The Physiologist*, Vol. 41, No. 1, 1998, page 59, "People and Places," as having left the GI Section of the VA Medical Center in Milwaukee, WI. Shaker had accepted the position of Chief of the Division of Gastroenterology and Hepatology, Froedtert Memorial Lutheran Hospital, affiliated with the Medical College of Wisconsin. She has also continued to maintain her position at the Clement Zablocki VA Medical Center as a staff physician and as acting chief of the Gastroenterology Section. *The Physiologist* regrets this error.

People and Places

APS Members Elected to AAAS

The *American Academy of Arts and Sciences* (AAAS) has announced the election of 147 new fellows and 22 foreign honorary members. Following is a list of the newly elected fellows and members who are also APS members.

Marcus E. Raichle, Edwin Mallinckrodt Institute of Radiology, St.

Louis, physiology, pharmacology, neurobiology, and behavioral biology.

Richard W. Tsien, Stanford University, medicine and public health.

Roger Y. Tsien, University of California at San Diego, physiology, pharmacology, neurobiology, and behavioral biology.

Michael J. Welsh, University of Iowa, medicine and public health.

Pierre Corvol, College de France, physiology, pharmacology, neurobiology, and behavioral biology. ❖

APS Member Elected to NAS

The *National Academy of Sciences* (NAS) has recently elected 60 new members and 15 foreign associates "in recognition of their distinguished and continuing achievements in original research." Among the new NAS members is APS

member **Roger Y. Tsien**, an investigator at the Howard Hughes medical Institute, and professor of pharmacology, chemistry, and biochemistry, at the University of California at San Diego. ❖

Orkand Receives Fulbright

Richard Orkand, Institute of Neurobiology, San Juan, Puerto Rico, was recently given a Fulbright Scholar Award for 1998-1999. The award is for a four month duration in the Department of Neuroscience at the Institute of Experimental Medicine in Prague, where he will work with Eva Sykova on "Membrane Properties of Glial Cells in Rat Brain Transplants." ❖

Books Received

Biology by Numbers: An Encouragement to Quantitative Thinking.

Richard F. Burton.

New York: Cambridge University Press, 1997, 238 pp., illus., index, \$19.95.

ISBN: 0-521-57698-9.

Cold Ocean Physiology.

H.O. Pörtner and R.C. Playle (Editors).

Society For Experimental Biology Seminar Series: 66.

New York: Cambridge University Press, 1998, 498 pp., illus., index, \$125.00.

ISBN: 0-521-58078-1.

Eicosanoids, Aspirin, and Asthma.

Andrzej Szczeklik, Ryszard J. Gryglewski, and John R. Vane (Editors).

Lung Biology in Health and Disease Series: 114.

New York: Dekker, 616 pp., illus., index, \$195.00.

ISBN: 0-8247-0146-1.

From Sound to Synapse: Physiology of the Mammalian Ear.

C. Daniel Geisler.

New York: Oxford University Press, 1998, 381 pp., illus., index, \$65.00.

ISBN: 0-19-510025-5.

The Heart and Lung in Obesity.

Martin A. Alpert and James K. Alexander (Editors).

Armonk, NY: 1998, 253 pp., illus., index, \$81.00.

ISBN: 0-87993-685-1.

Oxygen Transport To Tissue XIX.

David K. Harrison and David T. Delpy (Editors).

Advances in Experimental Medicine and Biology, Vol. 428.

New York: Plenum, 1997, 718 pp., illus., index, \$175.00.

ISBN: 0-306-45711-3.

Physiology and Pathophysiology of the Islets of Langerhans.

Bernat Soria (Editor).

Advances in Experimental Medicine and Biology, Vol. 426.

New York: Plenum Press, 1997, 457 pp., illus., index, \$125.00.

ISBN: 0-306-45702-4.

Principles of Animal Design: The Optimization and Symmorphosis Debate.

Ewald R. Weibel, C. Richard Taylor, and Liana Bolis (Editors).

New York: Cambridge University Press, 1998, 314 pp., illus., index, \$32.95.

ISBN: 0-521-58667-4.

Psychiatric Disorders with a Biochemical Basis.

David Donaldson.

New York: Parthenon, 1998, 241 pp., illus., index, \$47.00.

ISBN: 1-85070-787-9.

Pulmonary Edema.

Michael A. Matthay and David H. Ingbar (Editors).

Lung Biology in Health and Disease, Vol. 116.

New York: Dekker, 1998, 732 pp., illus., index, \$225.00.

ISBN: 0-8247-0150-X.

Recent Advances in Arthropod Endocrinology.

G.M. Coast and S.G. Webster (Editors).

Society for Experimental Biology Seminar Series: 65.

New York: Cambridge University Press, 1998, 406 pp., illus., index, \$110.00.

ISBN: 0-521-59113-9.

Why Geese Don't Get Obese (And We Do).

Eric P. Widmaier.

New York: Freeman, 1998, 213 pp., illus., index, \$22.95.

ISBN: 0-7167-3147-9.

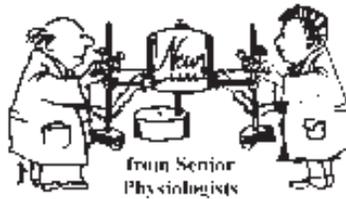
News from Senior Physiologists

Letters to Arthur Vander

Horace W. Davenport writes: "When Arthur Vander asked me, as an 85-year old Senior-Senior Physiologist, to contribute some news or opinions to *The Physiologist*, I refused. Everything I had known or done as a physiologist is dead, and I refused to engage in the customary hand-wringing about how physiology has been taken over by molecular biologists who don't know anything about classical physiology. I told Arthur it had been fun to learn about such topics as ventilation-perfusion ratios in the lungs and to teach students about them and their significance, and I wondered if present day physiologists enjoy their subject as much as I had enjoyed mine. Upon reflection, I thought a few readers of *The Physiologist* might be amused by an early experience of mine relating to ventilation-perfusion ratios.

"I became head of the Department of Physiology at the University of Utah in 1945, and for a while I thought it was my duty to attend some of the Grand Rounds and teaching clinics in the hospital. At the end of a Medical Grand Rounds the Professor of Medicine would say politely: 'Perhaps Dr. Davenport would like to say something about this,' and I would have to find a quick way of not making a fool of myself about a problem I had first heard about a few minutes earlier. I was asked a similar question at the end of a teaching clinic given for the first year students by Dr. Richards. Utah was full of Dr. Richardses, some medical and some surgical and some very distinguished in their specialty. This was old Dr. Richards, a surgeon who was known for having prescribed routine treatment with 100% oxygen in the recovery room with the result that post-operative morbidity and mortality had plummeted. That was the topic of the clinic I was asked to comment upon.

"I had just finished reading Cecil Drinker's little book, his *Lane Lectures on Edema*. Drinker whom I had known and admired when I was at Harvard was the King of Lymph. He refined jewelers'



tools so that he could collect lymph from almost every organ, and the results of his analysis of lymph had answered physiological questions and explained some pathological conditions. Drinker's story based on animal experiments was that the dependent parts of the lungs lying along the spine of a recumbent patient become poorly ventilated although they continue to be perfused with venous blood. As the tissue becomes progressively hypoxic, the capillaries leak plasma proteins into the alveolae, providing a medium for ubiquitous pneumococci. As soon as I revealed the source of my comments, old Dr. Richards interrupted me, and turning to the class he said: 'Now you pay attention to what he says. Although Drinker was a physiologist he had some horse sense!'"

J. H. U. Brown writes: "Thank you for your kind letter. It hardly seems 80 years since I was born and some 60 since I started in physiology. I am happy to respond to you a little. I still work more than half time. I am the District Manager of SCORE (Service Corps of Retired Executives), a non-profit national group which assists young people in starting in business in conjunction with the SBA and banks.

"This end of my career also expresses very well my life-long philosophy. I have always believed that if something had no practical use, it was (to me) of little value. My work in physiology was always aimed at understanding organ systems with an eye to treatment. It was on this basis that I developed a treatment for cancer still in use, the computer work which dealt with patient records, and the development of consortia between universities and research institutes to develop new methods of treatment.

"I was fortunate to be recognized in the field. Although I am a physiologist in training and inclination, I was one of the first of my ilk to be elected to the National Academy as an engineer."

Kao Liang Chow writes: "Thanks for your kind notes about my 80th birthday. I am grateful to APS' concern with us older members. I retired in 1984. The Department of Neurology at Stanford let me keep my office. I come in a few days a week, mainly to participate in laboratory meetings and seminars, but no teaching or research. I try to keep up with developments of my field, i.e., neurobiology of vision and memory. I feel that one should plan ahead about what one wants to do in retirement.

"My health is reasonably good, only have a slight cardiac arrhythmia which is controlled by drugs. My wife, Margaret, had a stroke 3 years ago. We used to travel often, but not now. We hope, in time, we will be able to travel again."

Letters to William Stekiel

Andrew Schally writes: "Thank you for your kind letter of December 16. I have not retired. I am continuing my work in experimental endocrine oncology. Since the work on cancer is very demanding, my life is as hectic as ever."

Anada Prasad writes: "Thanks for your letter dated March 6, 1998. I am still working full time as Professor of Medicine, Division of Hematology-Oncology at Wayne State University. I do consults in Hematology and participate in teaching of students, Residents in Internal Medicine and Fellows in Hematology, for three months in a year. The other nine months, I am involved in research. My major interests are in the fields of zinc, iron and copper metabolism in human health. I have just received a NIH-NCI grant for studies

News from Senior Physiologists

related to the effects of zinc supplementation on cell-mediated immunity in patients with head and neck cancer.

"At the basic level, we are exploring the role of zinc in the activation of NF-KB activation and the production of IL-2 in HUT-78, a T cell human malignant lymphoblastoid cell line.

"I am in good health and I hope that I can continue my academic duties and research activities for a few more years. I am also Editor of *American Journal of Hematology* and the *Journal of Trace Elements in Experimental Medicine*.

"My research activities have been truly very stimulating and rewarding. Every little contribution that I have made to science has given me a great deal of satisfaction, in spite of all the frustrations of daily life in obtaining proper research support."

Letter to Eugene Renkin

Seymour Katsh writes: "Belated or not, your thoughtful letter of 13th February, 1998, is invigorating. Not since Roy

(Greep) have I heard from my favorite society--American Physiological Society.

"Two points of interest:

"1. The card depicting William Beaumont House--how many of recent vintage can recall his contribution?

"2. The postage stamp on your envelope honoring Raoul Wallenberg--an honorary citizen of the United States of America for all his daring courage during World War II. I know, as a son of parents who immigrated to the USA to escape persecution in Russia, his name will shine together with that of the most socially and politically advanced country in the history of the world. Our parents were able to live and educate themselves and their children here and nowhere else.

"Yes, I am still active, going daily voluntarily to fulfill commitments and to assist in all matters called upon: advisory, administrative, grants/contracts proposals, manuscript preparation and modification, laboratory investigations in immunopharmacology, immunopathology,

immunoreproduction, autoimmune disorders, etc., which my wife and I investigated for years.

"As student, professor and researcher, my wife Grace and my children Sara, Judith, and Naomi deserve the highest honors. Their love, their caring, their patience, understanding, and sacrifices throughout the years and adversities stand as a beacon for all.

"As for words of wisdom for our colleagues, I do not believe wisdom is age-related, at least not stoichmetrically. With age come experiences that may teach how better to respond, how best to avoid pitfalls or even how to be cleverly evasive. Therefore, for me, the honest, dedicated, hard-working thinker with common sense (sachel) is as close as I can hope to experience a collegial spirit. So, any pearls of wisdom from any source possessing that rare attribute would be most welcome at this address."



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- Check out our **Positions Available** ads for job listings, including pre- and post-doctoral fellow, instructor, industrial, and faculty positions. Ads are accepted for either positions available or positions wanted under all categories.
- For excellent career advice, information on different career paths, job-seeking strategies and more, see the statistics reports, articles by physiologists, and tip sheets located on the **Career-Related Articles** page.
- We have compiled a number of links to job and career information online, research and training opportunities, and other sites of interest for job-seekers. Just go to the **Links to Career-Related Information** page.

Cystic Fibrosis Current Topics

J. A. Dodge, D. J. H. Brock, and J. H. Widdicombe (Editors)
Somerset, NJ: Wiley, 1997, 369 pp.,
illus., index, \$99.95
ISBN: 0-8247-9722-1

In 1989, the defective gene responsible for cystic fibrosis (CF) was identified and its protein product named the cystic fibrosis transmembrane conductance regulator (CFTR). With the identification of the CFTR gene, the molecular abnormality responsible for the cell and tissue defects in CF could be investigated and new therapies based on a rational understanding of the disease developed. The pace of discovery has been rapid and as a result, many textbooks of CF research have become obsolete. To overcome this problem, John Dodge, David Brock, and Jonathan Widdicombe conceived the idea of a series of books that summarize the latest developments in CF research. Each volume contains new information about the molecular genetics of CF, the cell and molecular physiology of CFTR, and the clinical management of CF, written by internationally recognized experts. The chapters are well-written and illustrated, and each is accompanied by an extensive bibliography. Thus, these books are an invaluable source of reference for the CF research community. They should also be of interest to other investigators including those studying epithelial ion transport, ion channels, and ATP-binding cassette (ABC) transporters.

CFTR is a small conductance Cl^- channel, regulated by phosphorylation and ATP hydrolysis, that is predominantly located in the apical membrane of epithelia. In the latest volume in the series, *Cystic Fibrosis Current Topics*, two chapters investigate the molecular basis of CFTR Cl^- channel function. David Dawson and his colleagues comprehensively review what is known about the relationship between the structure

and function of the CFTR Cl^- channel. David Gadsby and Angus Nairn explain the complex regulation of CFTR Cl^- channel gating by protein kinases and phosphatases, and hydrolysable nucleoside triphosphates. This chapter is likely to be widely consulted by investigators studying the gating behaviour of ion channels.

In addition to its best-characterized function as a regulated Cl^- channel, CFTR has been suggested to have other roles in epithelial cells, including the regulation of other ion channels. Jackson Stutts summarizes the evidence for CFTR regulation of the outwardly rectifying Cl^- channel (ORCC) and the epithelial Na^+ channel (ENaC) in airway epithelia. He discusses possible mechanisms by which CFTR may regulate ORCC and ENaC and the physiological significance of this regulation.

Many CF-associated mutations, including the most common, DF508, cause a loss of Cl^- channel function because they disrupt the processing of CFTR and its delivery to the apical membrane of epithelial cells. In this volume, two chapters examine the intracellular processing of wild-type and mutant CFTR. Cristina Ward and Ron Kopito concisely review recent new information about the biosynthesis of CFTR, such as the degradation of CFTR by the ubiquitin-proteasome system. Andrew Morris describes the mechanisms that control the targeting and trafficking of CFTR in cultured intestinal epithelial cells. These include GTP-binding proteins, and protein kinases and phosphatases that regulate vesicle movement between intracellular compartments in the biosynthetic pathway.

A wide spectrum of clinical pathology is associated with mutations in CFTR. The typical CF phenotype of severe lung disease and exocrine pancreatic dysfunction is caused by genotypes that cause a complete loss of CFTR function. However, as highlighted by Lucy Osborne, congenital bilateral absence of the vas deferens (CBAVD), a male infertility disorder, is associated with genotypes that preserve some CFTR function. Other chapters of interest to geneti-

cists include a review of the evolution of CF alleles, and two articles on screening for mutations in CFTR.

The major causes of debilitation and death in CF are chronic obstructive lung disease caused by thick mucus secretions and persistent bacterial infections of the respiratory airways, commonly with *Pseudomonas aeruginosa*. In this volume, two chapters describe treatments for these conditions. Anne Thomson describes the pathogenesis of hypersecretion in CF and the use of mucolytic agents, such as human recombinant DNase, in the management of CF. Robert Hancock and David Speert summarize the efficacy of the different antibiotics available to treat *Pseudomonas aeruginosa* infections and the different routes by which these drugs may be administered. The final chapter, which discusses clinical scoring systems for CF, should be read by those planning clinical trials of new therapies for CF.

As the editors acknowledge, the problem with the series *Cystic Fibrosis Current Topics* is that much of the information rapidly becomes out of date. Since the publication of the latest volume, Smith et al. (1) demonstrated that a loss of CFTR Cl^- channel function prevents the killing of bacteria by salt-sensitive antimicrobial factors that are present in airway surface fluid, Rozmahel et al. (2) identified a secondary genetic factor that modulates the severity of intestinal disease in CF mice, and Rubenstein et al. (3) discovered that sodium 4-phenylbutyrate, a drug that is approved for clinical use, can overcome the defective processing of the DF508 mutation. If they haven't already done so, perhaps it's time that editors began to prepare the next volume of *Cystic Fibrosis Current Topics*. ♦

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1. Smith, J. J. et al. *Cell* 85: 229-236, 1996.
2. Rozmahel, R. et al. *Nat. Genet.* 12: 280-287, 1996.
3. Rubenstein, R. C. et al. *J. Clin. Invest.* 100: 2457-2465, 1997. ♦

David N. Sheppard
University of Edinburgh

Book Reviews

Optimizing Sport Performance

David Lamb and Robert Murray (Editors)

Perspectives in Exercise Science and Sports Medicine, Vol. 10

Carmel, IN: Cooper, 1997, 365 pp., illus., index, \$45.00

ISBN: 1-88412563-8

Optimizing Sport Performance is the 10th edition of edited volumes in exercise science in sports medicine sponsored by Gatorade. The volume encompasses a wide variety of established or putative ergogenic aids as well as topics that have performance consequences (e.g., immune function and injury). Chapters are topically organized and each includes sections on practical implications and directions for future research. Each chapter is also followed by a transcription of the discussion that followed the conference presentation. These sections are insightful, particularly because they involve dialog among the chapter authors and other experts. As these discussions highlight current issues and controversies in the data, it may be useful for readers to peruse them prior to reading each chapter. Chapter one is an overview of applied sport psychology by William Morgan, and is perhaps the broadest in scope of all the contributions. Morgan casts a critical eye on the extant literature and soundly debunks some of the widely favored techniques of sport psychology including relaxation and goal setting. Various methodological limitations of the literature are discussed, in particular the absence of placebo comparison conditions. For exercise scientists unfamiliar with the sport psychology literature, this information is particularly useful. Chapter two "Advances in the Evaluation of Sports Training" by Harms Kuipers provides a wide ranging overview of the various means used to assess not only exercise capacity and performance but also methods used to monitor the response to overtraining. The

discussion of heart rate monitors, while brief, outlines the potential problems associated with relying in single measurements. Edward Coyle presents a comprehensive overview of exercise and carbohydrate in chapter three. A reasonably detailed overview of energy utilization during exercise is presented which precedes discussion of the literature on supplementation prior, during and following exercise. The consequences of various types of carbohydrate are also presented. Importantly, Coyle summarizes research findings regarding the putative ergogenic effects of recently popularized high fat diets, and the conclusions drawn from the literature compellingly supporting the central importance of carbohydrate to prolonged exercise performance. Ron Maughan's chapter presents the literature on hydration and exercise and the various factors that interact with hydration. The complexities of what may initially seem like a simple issue are well described, particularly notable are his efforts to address equivocal findings in the literature. The practical information in this review would be helpful to the researcher and athlete alike. Lawrence Spriet reviews the literature on nutritional and other exogenous ergogenic aids. The discussion is delimited to findings regarding creatine, carnitine, caffeine, and erythropoietin, in large part because of the acceptance of these substances by the athletic community. In each case the theoretical basis is presented and the findings of recent studies are presented, as well as descriptions of potential health consequences. Spriet gives particular attention to methodological weaknesses and confounds in the extant literature. For example, the long washout period for creatine precludes the use of crossover studies. Issues regarding subject characteristics and performance measures are also well-described and would be helpful to researchers contemplating research on these or other ergogenic factors. Randy Eichner's chapter addresses health screening in athletes, particularly for cardiovascular disease. The most common forms of cardiovascular disease and trauma are presented.

The various means of screening and their limits are described, both in terms of sensitivity and specificity. Information on the consequences of other health conditions found in athletes is also presented. Perhaps most importantly, the useful practical information on screening and treatment is provided throughout this chapter. Davis and Colbert overview the literature on exercise and immune function, focusing specifically on the potentially deleterious consequences of intense acute exercise and chronic overtraining, particularly regarding upper respiratory track infection. A detailed overview of the immune system and the roles of specific immune factors precedes discussion of the exercise literature. Research involving animal models is presented but the authors are careful to delineate the limits of these findings to humans. Overtraining research is presented and again the authors are careful to point out the short-comings of these studies, particularly the lack of a clear etiology and definition of the overtraining syndrome (i.e., staleness). The final chapter by Perry, Knapp, and Mandelbaum concerns injury prevention and recovery, focusing on injuries of the knee, ankle and stress fractures. The various factors contributing to these injuries are discussed and useful flow charts of diagnosis and treatment are presented. Preventive measures are also discussed. The information in this chapter is rather technical and more suited for sport medicine physicians or athletic trainers.

In summary, *Optimizing Sport Performance* provides a comprehensive overview of the current state of research on ergogenic aids. The book would be appropriate as an advanced level undergraduate text or a graduate text for a course on human performance. The authors should be lauded for including recent studies and summarizing findings with a goal of resolving controversies or differences in the literature wherever possible. As such, the book would also be useful to exercise scientists who conduct research on these topics. ❖

John Raglin
Indiana University, Bloomington

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Book Reviews

The Origins and Consequences of Obesity

Ciba Foundation Symposium 201
New York: Wiley, 1996, 278 pp., illus.,
index, \$84.95
ISBN: 0-471-96506-5

The Origins and Consequences of Obesity is the result of a three-day conference held in Kingston, Jamaica over two years ago in November 1995. The conference was organized by the Ciba Foundation and participants included a multidisciplinary group of 30 experts in obesity, representing institutions in the United Kingdom (9), United States (8), Jamaica (5), Denmark (2), Sweden (1), Finland (1), Barbados (1), Canada (1), Italy (1), and New Zealand (1). The book includes 14 chapters representing the oral presentations made at the conference. These chapters cover the epidemiologic, genetic, metabolic, nutritional, behavioral, psychosocial, economic, and therapeutic aspects of obesity.

Knowing a number of the conference participants, as well as the many areas of current scientific controversy in obesity, I imagine that the discussions were very active and free-wheeling. The editors of this volume (D. J. Chadwick and G. Cardew) appear to have captured the spirit of the discussions while at the same time imposing a useful structure on the interchange among participants that occurred at the end of each presentation. Each chapter ends with a discussion section that recapitulates and orders the interchange. In addition, two lengthier general discussion sections are included between related groups of chapters. I found it especially useful that many of the statements in the body of the discussion sections were referenced, and the full references were included at the end of each discussion section. Indeed, in some cases the discussion that followed a chapter made more interesting and more informative reading than the chapter itself.

If there is any criticism of the book's format it is with the order of the chapters.

The title of the book suggests that the putative etiologies of obesity will be presented first (genetics, metabolic efficiency, intrauterine influences, dietary intake, physical activity, socioeconomic status) to be followed by obesity's biologic and health effects (hypertension, hypercholesterolemia, diabetes, cardiovascular disease, economic and psychosocial consequences). Instead, chapters on causes and effects of obesity are presented in no particular order. For example, separate chapters on diabetes and cardiovascular disease are followed by a chapter on genetics, while a later chapter on economic and psychosocial consequences of obesity is followed by a chapter on physical activity. Given the complexity and current uncertainties of these issues, greater comprehension would likely be achieved if the ordering of the chapters was more predictable.

Several limitations of the book are related to the time that has passed since the original conference was held. In the chapter on the epidemiology of obesity (Table 1, p. 7) age-standardized prevalence estimates of adult obesity, defined as body mass index $>30 \text{ kg/m}^2$, are given for a number of countries using data collected in the early 1990s. The prevalence estimate for the US, however (12%), is based on data collected in the late 1970s, because the most recent US data were just published in early 1998 (it is currently estimated that the prevalence of obesity in the US has risen to about 20%). The conference was held before last year's withdrawal from the market of the highly touted weight loss drugs fenfluramine (Pondimin®) and dexfenfluramine (Redux®). These drugs were withdrawn because they were found to be associated with a substantial increase in the risk of cardiac valvulopathy. Thus, the chapter on treatment of obesity expresses more optimism about the risk-benefit of pharmacotherapy for obesity than may now be warranted. This chapter also contained an unfortunate misinterpretation of one of my own studies, cited in the last two paragraphs on page 229 [Williamson et al.

(1995)]. Contrary to what is written, my study found no evidence that intentional weight loss reduced total or cardiovascular mortality in obese women without pre-existing illness.

The prospective reader of this volume should be forewarned that there was considerable lack of general agreement among this world-class group of experts about some very basic issues in obesity. For example, in two separate chapters — one on the genetics of obesity and one on obesity and socioeconomic status — the presenters indicated that heritability estimates suggest the genetic contribution to obesity is in the range of 25-40%. In the general discussion, however, this assertion was directly and forcefully challenged by a participant who believed that the bulk of the evidence suggested that the contribution of genetics to obesity was closer to 70%. Disagreement was also voiced by the participants in relation to the etiologic roles of dietary fat and physical activity as causes of obesity, as well as regarding the shape of the relationship between body mass index (a commonly used epidemiologic surrogate for total adiposity) and mortality risk.

The realization that such fundamental issues in obesity remain actively debated may lead the new researcher away from the field in disillusionment and despair. The more experienced, or more stout-hearted, researcher, however, may find this state of affairs ripe for disciplined, and ultimately fruitful research. Although this volume will not be terribly enlightening to scientists seeking an in-depth treatment of the specialty areas in obesity research, I certainly recommend *The Origins and Consequences of Obesity* to those contemplating a career in obesity research and to those established scientists interested in a rigorous, but broad, overview of the field. ♦

David F. Williamson
Centers for Disease Control
and Prevention

The Physiologist

is now available via the World Wide Web.
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Book Reviews

Multiple Choice Questions in Physiology, 3rd Edition

Lynn Bindman, Peter Ellaway, Brian Jewell and Laurence Smaje
New York: Oxford University Press, 1997, 131 pp., illus., \$22.95
ISBN: 0-340-67677-9

This book is a well-written and meticulous compilation of questions utilized in the Medical Physiology course at University College London. The format of the book is conducive to rapid review, quick examination of one's level of knowledge and easily accessible correct answers. On the left, multiple-choice questions are presented; each with multiple true and false choices. On the right, the corresponding correct answers and concise explanations are given. A total of 158 questions are included in the book. The information presented is accurate, choices are clear and ambiguities are rare. The British flavor of the book is obvious in expressions such as adrenaline, nerve fibre, litre, etc. but should not overly distract US readers.

The organization of the book and the order of presentation of topics are somewhat unique. Cell physiology, for example,

is in section nine; gastrointestinal physiology receives greater coverage than renal physiology. Hypertension and the role of the kidneys in hypertension are largely ignored while anemias receive extensive coverage. General physiology topics are scattered throughout the book and are not covered in a separate section. Some general physiological principles such as body fluid compartments and their composition; water channels; Na^+ , K^+ , Cl^- , Ca^{2+} and other ion channels; cellular polarity and the biophysical principles guiding physiological processes receive only cursory attention or none at all. Temperature regulation is only slightly covered. For renal physiology: counter-current multiplication; renal blood flow; pressures within intrarenal compartments; regulation of afferent and efferent arteriolar tone; renal paracrine hormones; renal nerves; the regulation of renin release need additional coverage. In addition, the acid-base section is very brief. The renal proton pump is not emphasized.

One of the greatest strengths of this book is its brevity. An average student can readily use it in one day. Its format and clarity aid quick learning. An admirable quality of the book is its stated desire (see Aims in Preface) to present questions that "test reasoning power and ability to interpret data" instead of just memory recall. The authors

succeeded superbly in this undertaking. Although the book covers only the absolute essentials of medical physiology, it should be very useful to students who are reviewing for final exams or Part I of the United States Medical Licensing Examination. Faculty may use it to prepare test questions that "all students should be able to answer." The price of the book is somewhat steep for its size (\$22.95 for 131 pages) but the quality of its contents may justify the cost.

In summary, "Multiple Choice Questions in Physiology" is a compact, well-written and high-quality review of the essentials of medical physiology. Its brevity is its strength (it can be studied in one day) as well as its limitation (it covers the absolutely essential concepts but it is skimpy in some areas). It should be useful for health professional students reviewing for exams and for busy faculty who wish to save time making up new test questions yearly. A great value in the book lies in its electronic adaptability. A selection of the questions can be downloaded from the World Wide Web for student or faculty use. ❖

Michael L. Kauker
University of South Dakota

Experimental Biology '99

April 17-21, Washington, DC, 1999

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Scientific Meetings and Congresses

1998

June 24-27

Endocrine Society 80th Annual Meeting, New Orleans, LA. *Information:* The Endocrine Society, 4350 East West Highway, Suite 500, Bethesda, MD, 20814-4410. Tel: 202-347-6659; fax: 202-347-6674; Internet: <http://www.endo-society.org>.

June 27-29

1st European Congress of Human Locomotion Sciences: From Scientific Research to Public Health, Verona, Italy. *Information:* G. Bovo, 37043 Castagnaro, Verona, Italy. Tel and fax: +39-0442-92436.

June 28-July 2

International Conference on Intensive Cardiac Care, Jerusalem, Israel. *Information:* ISAS International Seminars, PO Box 574, Jerusalem 91004, Israel. Tel: +972-2-6520574; fax: +972-2-6520558; e-mail: isas@netvision.net.il.

June 28-July 3

3rd International Congress of Pathophysiology, Lahti, Finland. *Information:* ISP98, Department of Physiology, University of Kuopio, 70211 Kuopio, Finland. Tel: +358-17-163-080 or 163-108; fax: +358-17-163-112; e-mail: isp98@uku.fi; Internet: <http://packer.berkeley.edu/conferences/isp98.html>.

July 19-24

International Symposium on Optical Science, Engineering, and Instrumentation (43rd Annual SPIE Meeting), San Diego, CA. *Information:* SPIE International Headquarters, PO Box 10, Bellingham, WA 98227-9861. Tel: 360-676-3290; fax: 360-647-1445; e-mail: sd98call@spie.org; Internet: <http://www.spie.org/info/sd>.

July 23-24

Cardiovascular Aging (XIII International Congress of Pharmacology Satellite Symposium), Nancy, France. *Information:* Cardiovascular Research Group, Faculty of Pharmacy, 5 rue Albert Lebrun, 54000 Nancy, France. Tel: +33-03-83-17-88-11; fax: +33-03-83-17-88-79; e-mail: atkinson@pharma.u-nancy.fr; Internet: <http://www.uhp.u-nancy.fr/Pharma/CRG>.

July 29-31

Immune-Neuroendocrine Interactions: Cellular and Molecular Mechanisms, University Park, PA. *Information:* Carey Shuey, Penn State University, 108 Althouse Laboratory, University Park, PA 16802. Tel: 814-863-1918; e-mail: cls20@psu.edu.

August 2-5

9th International Symposium on Vascular Neuroeffector Mechanisms, Porto, Portugal. *Information:* S. Giumarães, Institute of Pharmacology and Therapeutics, Faculty of Medicine, P-200 Porto, Portugal. Fax: +351-2-5502402.

August 17-21

Rice University Institute of Biosciences and Bioengineering Sixth Annual Seminar: Advances in Tissue Engineering, Houston, Texas. *Information:* Rice University, School of Continuing Studies - MS 550, 6100 Main Street, Houston, TX 77005-1892. Tel: 713-527-4803; fax: 713-285-5213; e-mail: scs@rice.edu; Internet: <http://www.rice.edu/scs/tissue>.

August 23-28

Fifth International Congress of Comparative Physiology and Biochemistry, Calgary, Alberta, Canada. *Information:* Secretariat, Fifth International Congress of Comparative Physiology and Biochemistry, Special Events and Conference Office, University of Calgary - Olympic Centre, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4. Tel: 403-220-5261; fax: 403-289-9311; e-mail: iccpb@acs.ucalgary.ca; Internet: <http://acs.ucalgary.ca/~iccpb99/>.

September 3-5

International Symposium on Ovarian Aging and Failure, Brussels, Belgium. *Information:* Belgian Menopause Society, 251 Avenue Reine Astrid, 1950 Kraainem/Belgium. Tel: +32-0-2-569-81-33; fax: +32-0-4-254-12-90; e-mail: ypc@compuserve.com.

September 6-9

European Atherosclerosis Society 70th EAS Congress, Jerusalem, Israel. *Information:* Yechezkiel Stein, 70th EAS Congress, PO Box 50006, Tel Aviv 61500, Israel. Tel: +972-3-5140014; fax: +972-3-5175674 or 5140077.

September 19-23

European Respiratory Society Annual Congress, Geneva, Switzerland. *Information:* European Respiratory Society, 1 boulevard de Grancy, CH-1006 Lausanne, Switzerland. Tel: 41-21-613-02-02; fax: 41-21-617-28-65; e-mail: @ersnet.org.

September 27-October 1

Brisbane '98: Asian-Oceanian Congress of Australian Physiological and Pharmacological Society, Australian Neuroscience Society, and Physiological Society of New Zealand, Brisbane, Australia. *Information:* Brisbane '98 Secretariat, GPO Box 2609, Sydney, NSW 2001, Australia. Tel: +61-2-9241-1478; fax: +61-2-9251-3552; e-mail: reply@icmsaust.com.au.

October 14-18

American Association of Electrodiagnostic Medicine 45th Annual Scientific Meeting, Orlando, FL. *Information:* AAEM, 21 Second Street SW, Suite 103, Rochester, MN 55902. Tel: 507-288-0100; fax: 507-288-1225; e-mail: aaem@aol.com.

October 10-12

Metabolism and Exercise: Regulation and Integration of Physiological Systems, Cleveland, OH. *Information:* Marco E. Cabrera, Case Western Reserve University, 11100 Euclid Avenue, Cleveland, OH 44106-6011. Tel: 216-844-5085; fax: 216-844-5478; e-mail: mec6@po.cwru.edu; Internet: <http://www.ccf.org/ri/bme/bmes>.

October 10-13

Relating Biomedical Engineering Research to Clinical and Commercial Applications. Annual Meeting of the Biomedical Engineering Society, Cleveland, OH. *Information:* Cleveland Clinic Foundation, Department of Continuing Education, 9500 Euclid Avenue TT31, Cleveland, OH 44195. Tel: 216-444-5696 or 1-800-762-8173; fax: 216-445-9406.

October 18-23

Principles and Practice of Tracer Methodology in Metabolism, Galveston, Texas. *Information:* Robert R. Wolfe, PhD, Course Director, UTMB/Shriners Burns Institute, Metabolism Department, 815 Market Street, Galveston, TX 77550. Tel: 409-770-6623; fax: 409-770-6825; e-mail: rwolfe@sbi.utmb.edu.



1998-1999 Meetings and Conferences

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September 16-19 1998; Augusta, GA

**The Paraventricular Nucleus of the Hypothalamus:
A Crossroads of Integrative Physiology**
December 5-9 1998; San Antonio, TX

Experimental Biology '99
April 17-21 1999; Washington D. C.

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