



# THE Physiologist

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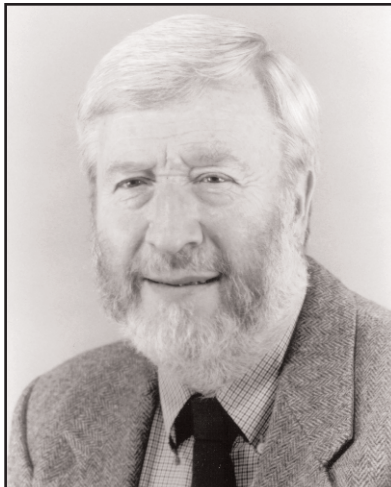
## Developing an Ethical View on the Use of Animals in Biomedical Research

Fourth Walter C. Randall Lecture on Biomedical Ethics

Adrian R. Morrison

University of Pennsylvania

The following is the text of the Fourth Walter C. Randall Lecture on Biomedical Ethics supported by Taylor University, Upland, IN, that was delivered by Adrian R. Morrison at Experimental Biology 2002 in New Orleans, April 23, 2002.



Adrian R. Morrison

I want to thank you for inviting me to speak today. It is a great honor to be entrusted with this lecture because I stand before you as one not formally trained in moral philosophy. I can only speak as a scientist, therefore, but one with more than 40 years of experience in experimentation. I note, as well, that last November marked the twentieth anniversary of my involvement with the philosophical question of animal rights and the attack on biomedical research by an extreme group of adherents to this idea. In November of 1981, I made the fateful decision to become an expert witness for the defense of Dr. Edward Taub in what was to become commonly known as the Silver Spring Monkey Case. This case, initiated by the actions of the fledgling People for the Ethical Treatment of Animals, led to several years defending him, the establishment of the Committee on Animals in Research of the Society for Neuroscience, and my eventual chairmanship of that committee from 1987-1990.

An attack by the Animal Liberation Front aiming to silence me in 1990 led me to examine in greater depth what was driving the animal rights movement and my own reasons for thinking differently. Thus, I bring you two decades' worth of thoughts and insights on the philosophical underpinnings of the animal rights movement and of my own use of animals.

In reality, during the first half of the last 20 years, my efforts were those of a warrior trying to hold a line of defense against

individuals I considered barbarians. Throughout that ten-year period I was intimidated by the idea of confronting the philosophical tenets of the animal-rights movement. It was easier to defend against the scientific aspects of the charges against us. What did I have to say that could counter professional philosophers, such as Peter Singer and Tom Regan, to mention the most prominent of those espousing animal rights and/or liberation?

But where were philosophers who could contradict these philosophers? Who could speak for us? At last, though, a wonderful book appeared in 1986, *The Case for Animal Experimentation: An Evolutionary and Ethical Perspective*, written by a Canadian philosopher, Michael A. Fox (4). Not only did Fox present cogent arguments supporting the morality of animal experimentation, he also gave marvelous examples from the hospital that demonstrated the clear value of such experimentation for solving serious medical problems. I was euphoric. Finally, we had the arguments to say: "Gotcha!" Then, my bubble burst, for one year later Fox (5) recanted, stating that a "radical feminist" had convinced him that he was wrong! I had learned my lesson: why did scientists have to depend on someone else to do their thinking? (I should note in passing that Carl Cohen published an excel-

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## Science Outreach—The Responsibility of Every Scientist

Mary Woolley, President, Research!America

In remarks given at the White House Office of Science and Technology Policy's 25th Anniversary Symposium, the Honorable John Edward Porter made an observation that bears repeating. He noted, "While I realize that scientists by nature often feel uncomfortable with advocacy, if we all stayed within our comfort zones, little would be accomplished. Though perhaps they are not well understood, scientists are highly respected in our society. They are also highly credible. When they speak with a unified voice, the people listen."

The American public values research that produces greater health and continued economic prosperity for our nation's citizenry, but, too often, they do not know where this research is conducted, who conducts this research or how to talk to those individuals. Being a "citizen scientist" is easier than is generally believed and its time has come.

Those doing research have made a difference in the annals of science and in the lives of countless individuals. Now, though, the opportunity to make a difference extends beyond the laboratory. Now, the opportunity to be heard as never before is apparent in Congress, in the media, in your state legislatures and in your local communities. Now is the time for you, the scientist, to speak out!

Why now? Because taxpayers and their elected representatives have every right to hold the scientists who are supported with their dollars accountable for recent large increases.

Why now? Because the Office of Management and Budget is talking about dropping increases for research funding at the National Institutes of Health in the fiscal year beginning October 1, 2003, to a mere two percent, chilling current research and essentially eliminating any new research.

Why now? Because opponents of somatic cell nuclear transfer, a.k.a. "therapeutic cloning," could very well



Mary Woolley

prevail in their effort to outlaw such research—if not this year, then next.

Why now? Because elected representatives continue to tell us that they only very rarely hear from individual members of the science community.

Why now? Because fewer than 40 percent of the adults in this country can name a single place where research is conducted.

Why now? Because the nation is deeply concerned about security and protection. Science and scientists can and must provide answers.

So, how do we achieve greater public awareness and understanding of research and researchers who provide hope for future preventions, treatments, and cures, not to mention sustained economic prosperity? Quite simply, by *talking about* research! As Porter and countless other members of Congress tell us, it is extremely important for researchers to engage in public outreach with nonscientists in their local communities, yet we know this is easier said than done. In public opinion polling conducted in partnership with Sigma Xi, the scientific honorary society, Research!America affirmed what we've been hearing anecdotally for years. Scientists say they are not involved in outreach for two primary

reasons: 1) they do not know how to become involved, and 2) they do not have time to participate in outreach activities. Additionally, in focus groups, researchers tell us that they often choose not to talk about their work with neighbors, friends, and others who are not part of the research community because they feel those people are not interested in science or are hostile to it. All these barriers to outreach need to be overcome, if as a community, we are to sustain research as a very high national priority.

### Getting Involved

When scientists make the effort to engage in conversation with nonscientists using nonscientific language, they are often pleasantly surprised at the outcome. For years, I have been telling the story about a researcher who took to heart my suggestions regarding science outreach. This particular researcher was flying back from a presentation and wanted only to do some writing and get home. When a fellow passenger inquired about the nature of his work, his instinct was to ignore him and continue writing. Then he remembered my words: "When someone asks you what you do, respond by saying, 'I work for you.'" He became engaged in a wonderful conversation with his fellow passenger. The relationship that developed from that single conversation resulted in the provision of two endowed chairs supporting his research! Of course, not all conversations with nonscientists will have this same outcome, but almost all of these conversations will make you feel better about the work you do in the public interest. Saying that you, as a scientist, serve the public interest is the single most important message you can convey.

### Finding the Time

Finding the time to participate in outreach may be the toughest of all challenges to overcome. However, outreach to your elected officials, family,

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neighbors and other beneficiaries of research does not have to take much time. For example, in only two minutes and with only four clicks of your mouse, you can send a letter to your elected representatives in Congress, urging them to support strong funding increases for medical and health research (visit us online at <http://www.researchamerica.org>). Another way to fight the time crunch is to develop your “30 second advocacy pitch” to use after you’ve initiated that conversation with, “I work for you.” The “30 second advocacy pitch” is a half-minute snapshot of why your research is important to the health of the nation’s citizenry and why the public should support that research. Practice your “30 second advocacy pitch” while driving to the office or walking to get lunch. Be sure to use non-scientific language and make it exciting to the non-scientist. Try it out on your family and friends and see how they respond when they discover that you are working on research that may one day bring better health to their children and grandchildren.

Draw on your affiliations with professional societies and advocacy organizations to help you craft messages and deliver them in a timely manner. For example, have you recently seen a story in your local newspaper that deserves a response? Let your professional society help with the wording and process of getting a letter to the editor written and sent. And be sure to call on Research!America for assistance with time-tested messages about the value of research to health and the economy. Asking for assistance from the professional societies you belong to or from organizations that specialize in crafting these types of advocacy messages is helping everyone advocate for research.

### Heightening the Public’s Interest in Science

Many scientists believe that the public has little interest in science. Nothing could be further from the truth! In fact, data from the National Science Board’s Science and Engineering Indicators notes that nine out of every 10 adults in the United States say they are very or moderately interested in new scientific

discoveries and the use of new inventions and new technologies. And a public opinion poll, conducted by the Newseum in late 1999, showed the public ranking science very high, placing five stories about scientific research in their list of the top 25 news stories of the century.

Additionally, in Research!America’s 2001 polls, strong public support for research is crystal clear. Seventy percent of American citizens said they support a proposal to double the federal investment in medical and health research—up from 43 percent in 1996. The public is not just responding in an idealistic fashion; rather, they are responding with the hope they have in science. For example, in focus groups conducted by Research!America, one participant said, “I believe in basic research, because I believe in possibilities.” As scientists, you are the advocates not only for research, but for the better health and future possibilities anticipated by the public.

Today, more than ever, science is on the American public’s radar screen. The attacks of September 11 and anthrax-related incidents thereafter have stimulated the country to look for new ways to protect our nation, not only from disease and disability, but from threats of terrorism as well. Research!America’s polls show the public strongly believes that scientists can help find the answers, as nearly 90 percent of those polled said the role of scientific research is “extremely or very important” in US efforts to prepare for and respond to biological and chemical terrorism.

Members of the public value the research that brings improved health, better quality of life and continued economic prosperity for all citizens. There is no better time than the present for scientists to speak up and help the public understand the scientist’s role in protecting the nation. ❖

Mary Woolley  
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## Get Involved & Make Your Voice Heard!

Here are a few ways:

When you see a story in your local newspaper about a research issue—such as therapeutic cloning—that is important to you, write a letter to the editor or call and talk with the journalist who wrote the story.

When you receive a research grant, write your Congressional representatives, thanking them for providing strong research budgets on behalf of the American public.

Visit Research!America’s Interactive Advocacy Center (located online at <http://www.researchamerica.org>). From there, you can write to President Bush and Congress, urging them to continue strengthening the medical and health research enterprise with strong funding of research budgets.

Speak out on behalf of medical and health research at town meetings and before community groups. Visit the

“Talking Points” section of Research!America’s website to find information about what is possible with more medical and health research.

Mentor a student or post-doc, not just in science but also in outreach. Encourage them to call their congressperson, write a newsletter article or address a local business or civic group.

Join a voluntary health organization like the American Cancer Society, March of Dimes, the Juvenile Diabetes Research Foundation International or the American Heart Association. They are advocates for research; you can extend your support to them.

Start listing public outreach activities on your vitae alongside publications and awards, giving credence to the value of your place on this activity.

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lent paper in 1986 in the *New England Journal of Medicine* [2] that countered Tom Regan's *The Case for Animal Rights* [11].

An additional lesson came in the form of a paper in the *Journal of the American Medical Association* by Richard Vance, a pathologist also trained in philosophy (22). Vance warned we should be aware that rather than simply presenting an emotional appeal against the use of animals, the animal rights movement was arguing from a philosophical point of view based largely on the works of Regan (11) and Singer (16). In addition to presenting their views in a very readable fashion for the layman, Vance revealed that each, coming from different schools of thought, had attacked the arguments of the other: Regan comes from the "rights" wing of moral philosophy; while Singer is a utilitarian. They do agree on the same political aim, however, eliminate all human use of animals (12). Vance concluded, "The problem, of course, is that without a consensus on a coherent theoretical foundation, they have no moral justification for their common political aims (22)." The important lesson for us is this: scientists should pay attention to the philosophical arguments, for if we do not think clearly and rigorously about the justifications for our research, we risk being forced to accept ever more restrictions on work some see, at best, as a "necessary evil."

Reading of Regan and Singer's philosophical clash, I came to the realization, naïve philosopher that I was, that one could create any world he wished with words. The critical issue then became clear: is the world one creates and urges on others by political action a livable world and, even more important, is it a world that the creator will live in himself? In the case of Regan and Singer (and all other leaders of the movement) the answer is, "No." As Stell (19) has noted, although prominent adherents to the animal-rights cause may eschew the eating of meat, the wearing of fur, etc., because in their eyes the methods of obtaining such products are cruel,

they have not been equally high-minded in stating a refusal to depend on modern medicine. After all, its methods of developing new medicines and techniques are cruel in their eyes and, thus, should be boycotted.

Let me digress now for a moment to reflect a bit on two terms: "biomedical ethics," the subject of this lectureship, and "bioethics." They are commonly used interchangeably. For example, there is a Center for Bioethics at my university, yet its concern is strictly with human beings and their treatment in medical situations.

But the term "bioethics," which first appeared in a paper in 1970 titled, "*Bioethics, the Science of Survival*," by Van Rensselaer Potter (10), had far broader meaning to its originator than its use today. Potter was a professor of oncology, who late in his career turned to broader questions, such as ensuring human health and protecting the environment. A recent obituary in the journal that published his landmark work, *Perspectives in Biology and Medicine*, quoted Potter's thinking behind the term he created:

"We are in great need of a land ethic, a wildlife ethic, a population ethic, a consumption ethic, an urban ethic, an international ethic, a geriatric ethic, and so on. All of these problems call for actions that are based on values and biological facts. All of them involve bioethics.... Mankind is urgently in need of new wisdom that will provide the 'knowledge of how to use knowledge' for man's survival and for improvement in the quality of life. This concept of wisdom as a guide for action—the knowledge of how to use knowledge for the social good—might be called the 'science of survival,' surely the prerequisite to improvement in the quality of life.... A science of survival must be more than science alone, and I therefore propose the term 'bioethics' in order to emphasize the two most important ingredients in achieving the new wisdom that is so desperately needed: biological knowledge and human values .... Man's survival may depend on ethics based on biological knowledge, hence bioethics (9)."

Potter was a lone scientist in

Wisconsin, ignored while the then developing Kennedy Center of Bioethics in Washington, DC absconded with Potter's term, limiting it initially at least to questions about treatment of humans (13). But I am not quibbling about terminology, because our interest today is our treatment of animals and only indirectly of human beings. We are developing a code of ethics for working with animals that combines science and ethics. Our knowledge of science permits us to say that we are not using animals for trivial reasons. Our ethical sense of identity with all humans allows us to put them first in our concern. I focus on this distinction because I believe it is very important to draw a line between our species and others. The Great Ape Project, which seeks to eliminate the moral and legal lines separating apes from humans, is the most ostentatious example of the blurring sought (1).

I believe, though, that Potter, who saw the limitations of merely curing people and not searching for ways to prevent illness, cancer, for example, would tell us researchers of our obligation to seek and promote healthy lives in a cleaner environment in order to reduce, even a bit, the use of animals.

Now, before I expand on what I think regarding our proper relationship with animals, let me introduce myself further as I did in an essay written for *The American Biology Teacher*:

"One should know from whence a particular set of principles comes. In my case, they derive from personal upbringing and my knowledge as a biologist. With regard to the former, I grew up on a small farm and worked for several years as a teenager on a large dairy farm, ultimately becoming a veterinarian. Consequently, I have a view of animals quite different from the great majority of the younger generations that have little experience with animals beyond seeing them as pets, as part of the family. I appreciate better, I am sure, the degree to which we are intimately involved economically with animals. At the same time, I realize that one's personal dignity

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depends upon proper treatment of those under one's control, which animals most assuredly are, individually and as part of the web of life. Because of our power and intelligence, we are constrained to respect all life, even while using it. To be fully human one must be humane. This characteristic clearly separates us from other species (7)."

Developing a particular view about life and, in the present case, about the legitimacy of using animals in research and how to use them requires time and, of course, experience. Obviously, I had an early concern for animal welfare, for I was 14 when I decided to become a veterinarian, disappointing my MD uncle in the process. My interest in farm life and love of my horse and horses in general found a home somewhere within me that withstood being surrounded by many pre-med friends at college. But, then, a love of the nervous system hit me in my second year in veterinary school, and a paradox emerged: I was to spend the rest of my life far from horses, farm life and caring for animals in the traditional way, watching cats and rats sleep instead, even causing pain in experimentation while still enjoying their company.

Yet, this is not far from the reality of clinical veterinary medicine in a community where a mixed farm and pet practice can still be found. A veterinarian and client may treat a pet as a little child, and then the veterinarian may move on to counsel a farmer to send his cow to slaughter because her economic value would not be worth the cost of treating her. Readers of James Herriot's series of books of a veterinarian's life in Yorkshire, England will recognize this reality of veterinary medicine.

I had never consciously thought in an organized manner about my rationale for using animals in research, thinking it was necessary had been enough for the first thirty years of my career. Yet, I had no trouble enunciating "my philosophy" in a letter I wrote in 1991 to Roger Caras, then President of the American Society for the Prevention of Cruelty to Animals and

a member of my school's Board of Overseers. I wrote to him as Director of the Program for Animal Research Issues in the former Alcohol, Drug Abuse and Mental Health Administration. Here is what I wrote:

"I believe animal use by humans is natural and no less appropriate in the scheme of things than animal use by other animals. Therefore, I reject as nonsense the notion of 'speciesism' that the animal-rights movement promotes. It is a perversion of biology, not a principle. Biomedical research fits into the category of appropriate uses, for it is a function of a legitimate aspect of our nature, which is to explore and increase knowledge. Indeed, increasing knowledge in all spheres, even if it requires the deaths of some animals, is our obligation as the most intelligent species (by far) on this planet.

"This is not to say that the invasiveness of vivisection is something I prefer or participate in without reflection. Because I do experimental surgery, I go through a soul-searching every few months, asking myself whether I really want to continue working on cats (we've had up to four of them at a time as pets over the years), or other animals for that matter. The answer is always 'yes' because from my knowledge of medical history I know that medicine cannot progress without animal experimentation and that such basic research leads ultimately to unforeseen benefits. I will add, however, that I am very happy that the scientific questions I am now trying to answer are best answered by studying laboratory rats rather than cats. But please note that this reflects a personal sensibility, which I am certain intervenes in the choices of experiments and species used that many scientists make.

"Of course, we should be concerned that there is appropriate care of animals in laboratories: that is a moral obligation. I believe we are doing a very good job now. This concern costs money, however, and I do not know when or where we draw the line. I've thought a lot about the proper allocation of resources because of friends I've made in the Incurably Ill for

Animal Research and after speaking to another patient group, the National Organization for Rare Diseases. This association represents groups of people with a myriad of rare diseases, many with absolutely dreadful features. Just the names of some of the diseases sound awful.

"My contact with the National Organization for Rare Diseases affected me greatly. Sometimes only a few hundred people have a particular disease, so they have to fight to get attention from researchers, money for the researchers, and money to fund development of drugs that reward drug companies with meager profits. How does one balance their misery and need for some of our limited resources with the pain or discomfort of thousands of laboratory rats or cats? The former would not even exist without the requirements of biomedical research, and the latter are among the many euthanized at humane shelters each year. Add to this the fact that one never knows when a particular finding will be useful in some totally unexpected context. Complicating the equation even further is the question of developing alternatives to whole-animal use. Should money be diverted from solving medical problems to finding out how to use fewer animals? This complex equation must ultimately be solved by society."

Since writing that letter I have matured into what I call my "First Principles of Research":

**Our first obligation is to our fellow humans.** Observing that all species strive to stay alive and then handicapping ourselves deliberately by not trying to understand the biological world would be just plain stupid. Indeed, I think it is my most powerful argument, one that no philosopher can defeat without being willing to risk sacrifice on behalf of animals. None has yet stepped forward. But can one also support this obligation philosophically? I believe so.

We are a species unique in our cognitive abilities. We create beautiful sculptures, write on philosophical issues and devise just laws, to use just a few examples. These laws, as well as religious and philosophical traditions

handed down from long ago, bind us together in a moral community. Yet, we are autonomous beings living in that community. Only we, of all species on earth, can be held accountable for our deeds, judged guilty in a court of law. We are burdened in a way that no other species is, even to the extent of caring for other species. These responsibilities make us special in my view

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## “Lately, I have come to realize the obvious: we decide what animals are to be in relation to us.”

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and warrant special consideration and compassion. I think it follows that we owe it to our fellow man to alleviate the pain and misery of disease through biomedical research

Furthermore, our capacity to suffer extends far beyond that of any animal. Immediate pain is one thing and something we must always consider when using animals in research. But I think now of mental suffering: the sense of loss of a child to disease or the despair of a teenager condemned to a restricted life due to a spinal cord severed in a head-on collision while playing football. We can empathize directly with these fellow humans. Being more certain of their suffering than that of any animal, we would be remiss in not putting our fellow humans first by doing research that might eventually help someone. To lack such empathy—and various animal-rightists have evidenced such a lack in their public statements—is inhuman and inhumane.

**All human beings are persons.** The average person says: of course! But not Peter Singer, author of *Animal Liberation* (16), called the “bible” of the animal-rights movement. He reasons in a newer book, *Rethinking Life and Death: The Collapse of Traditional Ethics* (18), that parents with a deformed or mentally defective infant,

one with Down’s syndrome, to use one of his examples, would be justified in rejecting, that is, euthanizing this “non-person,” for a baby only becomes a person to Singer (protected by law) at one month of age. This act would bring the parents more happiness if they then had a normal infant. Singer comes from the utilitarian wing of the branch of philosophy called ethics. The utilitarian perspective, at least as carried forth by Singer, allows one to seek the greater good or happiness offered by the normal replacement. This approach would be “convenient” but dangerous, not to mention that many with Down’s syndrome or other “defects” can develop into a reasonably productive and apparently happy person. George Will, in one of his regular *Newsweek* essays (24) observed that Singer, “like most people, is not well-informed about Down’s syndrome citizens, some of whom are taxpayers who read the sports pages on the way to work,” referring, I am sure, to his beloved son who has Down’s syndrome.

Singer is very explicit in his views. He states (18): “Likewise, we cannot justifiably give more protection to the life of a human being than we give to a non-human animal, if the human being clearly ranks lower on any possible scale of relevant characteristics than the animal.” Thus, a healthy rabbit would have more to offer the world than a brain-damaged human. Yet, the latter is a tragedy, and the rabbit lacks the potential that injured person had. Animals with higher cognitive abilities can be persons in Singer’s view.

He believes that we should abandon belief in the sanctity or specialness of human life and no longer exclude animals from our moral community. Consider this warning, though: “Far from pointing a way out of today’s moral dilemmas, Singer’s book is a roadmap for driving down the darkest of moral blind alleys, at the end of which, however spiffed-up and genteel, is Dr. Mengele: the embodiment of the triumph of power over principle, in the manipulation of life and death by the ‘fit’ at the expense of the unworthy’ (23).” Recall that Nazi Germany thought itself justified in doing away

with the physically and mentally handicapped for the good of the State even before they began the Final Extermination.

Singer emphasizes the concept of “speciesism,” which means that treating members of other species without considering their interests just because they are animals is akin to racism. This concept drives his thinking. Singer says that we should not treat members of other species differently than we treat members of our own just because the former are not humans. Although he states that he wishes to elevate animals (18), I think he drags humanity down to the level of animals with an emphasis on the capacity of all creatures to suffer pain. But the human species is so much more than that. Singer “ignores just about everything that has been said in our philosophical tradition about the real distinction between persons and animals (15).” We are a social, highly cognitive species with the capacity to participate in the suffering of people thousands of miles away. This enables rescue operations aided by people from distant places after an earthquake or flood. Again, this makes us special in my view. Certainly, we should not treat a member of another species with wanton cruelty just because they are not human—in this sense we are considering their interests—but our special duty to fellow humans warrants the use of other species in properly conducted biomedical research.

**Animals are not little persons.** This principle strikes at the heart of the dilemma a scientist or veterinarian faces, one who is very fond of animals, enjoys their company and yet uses them in research or must doom them to slaughter. Lately, I have come to realize the obvious: we decide what animals are to be in relation to us. Animals, of course, are oblivious to our categorizations. We eat pigs in some cultures and abhor them in others. We use them in experiments. Sometimes, they are even beloved pets.

Speaking of pets, even though we know they are not little persons, we treat them as such. Let me introduce

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you to my young cat, Buster, who captured my heart during his kittenhood. If I stopped walking while he was near me, he would lie on my feet so I would pet him before moving on. He would often stand on my chest while I lie in bed and look closely at me while purring very close to my face. What Buster was thinking, I will never know. Even now that he is mature, he visits me once or twice during the night and with a soft meow, settles down, purring, for a belly rub. When I have the occasional bagel with cream cheese for breakfast, Buster joins me for his dollop of cream cheese on the edge of my plate. If the menu calls for milk and cereal, Buster is beside me lapping up milk poured from the cereal bowl into a saucer. I talk to him all the time while he watches me working in the yard, but he never answers. When I move elsewhere, he follows, but at a distance chosen by him, then

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**“It is the scientist’s competence and knowledge of the literature that determine whether the animal’s participation is for a noble cause.”**

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climbs a tree, seemingly to show off. I think he may be fond of me, too.

Yet, as I have already said, for most of my career I used members of his species in my research on sleep mechanisms because, due to their size and habits, cats are well-suited for neurophysiological studies on sleep and other phenomena. And although I frequently asked myself whether I really wanted to continue, my faith in the process of science and knowledge of medical history, a belief that my work would provide a bit of knowledge ultimately useful for solving a human problem, allowed me to continue. Now, our work involves rats, and I am happy with this. To one who keeps a rat for a pet, however, this would not

be a satisfactory solution, again emphasizing the point that we decide what the animal is to be in relation to us.

**We have a great obligation to the animals under our control.** No words express this principle better than a passage from a book popular when I was a boy. For some reason the following conversation burned itself into my mind. In *My Friend Flicka* by Mary O’Hara, rancher Rob McLaughlin is speaking with one of his sons about a wild mare that had broken loose from their corral with the noose of a lariat around her neck:

“What if it did choke her?” asked Howard. “You always say she’s no use to you.” “There’s a responsibility we have toward animals,” said his father. “We use them. We shut them up, keep their natural food and water from them that means we have to feed and water them. Take their freedom away, rope them, harness them, that means we have to supply a different sort of safety for them. Once I’ve put a rope on a horse, or taken away its ability to take care of itself, then I’ve got to take care of it. Do you see that? That noose around her neck is a danger to her, and I put it there, so I have to get it off (8).”

This passage, read when I was about 14 and horse-crazy, clearly made an impact. In the days before we had a centralized animal facility and were responsible for our animals I never left for home without checking my cats and their food and water dishes. Fortunately, I had veterinary students I could trust caring for them on the weekends.

The point is that although laws administered by the Public Health Service and the Department of Agriculture govern the use of animals in the laboratory, animal welfare in the laboratory must begin with the scientist. It is the scientist’s competence and knowledge of the literature that determine whether the animal’s participation is for a noble cause. The process is not perfect, I admit, but these standards represent an important ideal. (I will give credit here to Singer, Regan and others for raising our awareness of the needs of animals, which led to improved standards of

care, but their lack of concern, or knowledge, of what their extreme

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**“Is it ethical to remain silent?”**

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demands would mean for humanity, I condemn).

Having made the choice that using animals in biomedical research for human benefit is appropriate, what ethical problems remain for me? If an experiment requires that animals be killed (and many do), there is no ethical problem in my view if the number killed is appropriate for the purpose and the method used provides for a death as quick and pain-free as possible. I hasten to add, though, that I do not minimize emotional cost here: that can be considerable. For example, after speaking of these issues at a university once, one of my hosts told me over lunch of how he felt on the “bad” days when he had to kill many rats to perform biochemical assays on their livers. And we who study animals in behavioral experiments over long stretches of time find it heart-rending at times to kill these animals in order to do the necessary examinations of their brains.

The ethical problem for me comes when animals have discomfort or, in some cases, real pain during experiments. Then we have moved beyond the activity that characterizes many of nature’s creatures, killing for immediate use, to one that is uniquely human: inflicting pain of varying degrees in order to learn. Most frequently this comes as a by-product of the inquiry, e.g., experimental surgery to develop new operations or to implant measuring devices. In special cases, though, researchers do this to study pain itself. None of this is easy for the normal person to do, but we scientists have reasoned that it is appropriate and necessary. However, we are then obligated to devise critical experiments and to perform them as skillfully and humanely as possible—in my view, the single, most important thing that we scientists can do to ensure our animals’ welfare.



Our obligations to animals we commonly call “rights,” for example, the right to proper food and water when under our care and the right to be treated humanely. Some philosophers emphasize these as moral rights rather than obligations (3, 20). Indeed, they are embodied in law (21). But these “rights” are far from saying animals are our moral equals, something the majority of the public recognizes intuitively, I am sure. These “rights” do not approach Regan’s extreme view: “If that (abandoning animal research) means that there are some things we cannot learn, then so be it. We have then no right against nature (because nature is not a moral agent) not to be harmed by those natural diseases we are heir to. (11).”

Coming from the rights branch of ethics, Regan argues that animals have “inherent value,” which proscribes our harming them. He argues that they are conscious and goal-oriented; therefore, they are “subjects of a life,” the quality that gives them the inherent value upon which we cannot trample. His stance would leave us helpless in the face of nature though. I should add that Regan’s view does not depend on mounting an argument against the utility of biomedical research as Singer (17) did, an argument sullied by not presenting the case honestly (14).

**Good science requires good animal care, but bureaucracy does not necessarily equate with increased welfare.** With governmental regulation comes a certain amount of bureaucracy. One must accept this because many regulations have improved laboratory animal welfare. The requirement that institutions have an oversight committee, an animal care and use committee that includes veterinarians, non-scientists and individuals not associated with the institution, as well as researchers, is now law. I am very much in favor of such oversight. Many excellent scientists, although as caring as the non-scientific public, lack training in veterinary medicine. They, their animals and their experiments benefit from the expert advice and oversight of veterinarians specializing in laboratory

animal medicine. Scientists know how rapidly ideas and techniques change in their own area of expertise but, I wager, do not stop to think that events move rapidly in the field of laboratory animal medicine as well. Yet, this new knowledge may save scientists time and money and even improve the science (6).

Furthermore, having to demonstrate to a diverse committee that one has planned an experiment intelligently with thought given to welfare of the animals to be used can only improve one’s experiments. With this system in place, laboratory animals are now receiving the best care humanly possible in my opinion, better than the general pet population. Of course, that improving animal care was not the aim of the animal-rights activists in the 1980’s is tragically clear. Laboratories continue to be destroyed and scientists, harassed.

With official oversight, of course, comes the danger of stultifying bureaucracy. Currently, some US Department of Agriculture inspectors, I am told, can go beyond reason (or the Animal Welfare Act that directs them) in demanding the compliance of institutions. Local overseers are themselves overseen by the government and so are susceptible to the very human concern not to be accused of inadequacy.

My belief is that underlying the admirable wish of some to treat animals as humanely as possible is a feeling of guilt: “What we are doing is wrong so let us at least do it as close to perfectly as possible.”

While we should do our best, I do not believe we need feel guilty. We, should, therefore, speak out when bureaucracy threatens to exceed the requirements of good animal care. Our recent effort to block the move to include rats, mice and birds under the Animal Welfare Act, which would create a tremendously costly duplication of effort without affecting their welfare, is a case in point.

To conclude, I prefer to think that these ideas are not unique to me. I want to believe that the vast majority of those who use animals in their research would agree with all or most

of what I have said and, in particular, with my First Principles of Research. To repeat them, 1) our first obligation is to our fellow humans; 2) all human beings are persons; 3) animals are not little persons; 4) we have a great obligation to the animals under our control; and 5) good science requires good animal care, but bureaucracy does not necessarily equate with increased welfare. My hope is that more scientists will step forward to inform the public of their own views on the important societal issue of the use of animals in biomedical research. Is it ethical to remain silent?

#### Acknowledgements

These thoughts are adapted from previously published essays in E. Paul & J. Paul (Eds.), *Why Animal Experimentation Matters: The Use of Animals in Medical Research*. (pp. 49-70). New Brunswick: Transaction Press, and M.E. Carroll and J. B. Overmier (Eds.), *Animal Research and Human Health: Advancing Human Welfare Through Behavioral Science*. (341-356). Washington, DC: American Psychological Association and reference 7. I thank those who have supported my public education efforts. ❖

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## Program Announcement

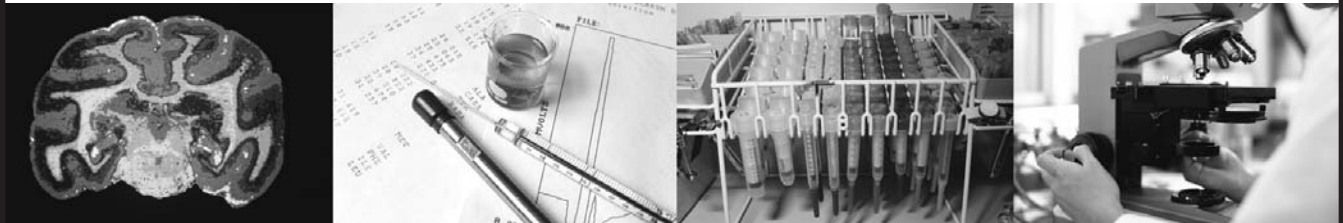
**Porter Physiology Fellowships for Minorities**

**Closing Date for New Applications:**  
June 15, 2002

**Announcement of Awards:**  
August 20, 2002

**Annual Stipend: \$18,000**

**Duration of Fellowship: 1 year  
with possibility of 2nd year of  
support**



The **Porter Physiology Fellowships for Minorities** are open to underrepresented ethnic minority applicants (African Americans, Hispanics, Native Americans, Native Alaskans, or Pacific Islanders) who are citizens or permanent residents of the United States or its territories. Applicants must have been accepted into or currently be enrolled in a graduate program pursuing an advanced degree in the physiological sciences.

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education@the-aps.org

[http://www.the-aps.org/education/minority\\_prog/porterfell.htm](http://www.the-aps.org/education/minority_prog/porterfell.htm)

Sponsored by: APS Porter Physiology Development Committee

## Introducing...Raouf A. Khalil

**Raouf A. Khalil** became the Chair of the Membership Committee and assumed duties in January 2002, succeeding **Martha O'Donnell**. Khalil has previously served on the APS Membership Committee from 1999 to 2001. Khalil is presently on the Editorial Board of the *AJP: Heart and Circulatory Physiology*. Khalil is also serving on the Editorial Board of the *AJP: Regulatory, Integrative, and Comparative Physiology* and has previously served on the Editorial Board of the Journal from 1998 through 2001. Khalil is an American Heart Association (AHA) Established Investigator and active member in the Council for Basic Cardiovascular Sciences and the Council for High Blood Pressure Research of AHA. Khalil is also an active member of the Biophysical Society.

Khalil is presently a Research Health Scientist at the VA Boston Healthcare System and Assistant Professor of Physiology in Medicine at Harvard Medical School. Previous to his appointment at Harvard Medical School, he was Associate Professor and Graduate Program Director in the Department of physiology and Biophysics at the University of Mississippi Medical School from 1998 through 2002, Assistant Professor at the University of Mississippi Medical Center from 1996 through 1998, and instructor at Harvard Medical School from 1992 through 1994. Khalil received his MD from Cairo University in 1976 and his PhD from the University of Miami School of Medicine in 1989, and did postdoctoral work at Harvard Medical School and Beth Israel Hospital from 1989 through 1992.

Khalil's research focuses on the signal transduction mechanisms involved in vascular contraction and relaxation and the changes in these mechanisms with gender and in pathological conditions, such as hypertension and coronary artery disease. These important areas of research blend a variety of physiological approaches with biochemical and



**Raouf A. Khalil**

imaging techniques. The goal of these research efforts is to develop strategies for prevention and treatment of cardiovascular diseases such as coronary artery disease, essential hypertension and hypertension of pregnancy.

As the newly elected Chair of the Membership Committee, Khalil has several strategic goals for the next three years. The first goal is to increase the number of first time members by 5% over the previous year. This goal can be achieved by: 1) Vigorous membership campaigns to aggressively promote and expand the APS membership worldwide. 2) encouraging the Membership Committee to help recruit membership prospects and assist with the recruiting; 3) exploring incentive packages for membership recruitment; 4) networking with media to promote membership campaigns; 5) assembling and staffing a booth at major national and international scientific meetings to provide information and accept applications on site; 6) and developing plans to promote electronic and online membership applications.

A second strategic goal of the chair is to maximize member retention and maintain a membership retention rate of at least 95%. Tactical goals will include: 1) hosting a New Member

Annual Reception and Banquet during the Experimental Biology meeting to communicate benefit information and encourage active involvement; 2) maintaining contact with new members and encouraging attendance to at least one APS event by utilizing staff and member peers; 3) contacting all renewal accounts up to four times; 4) considering discounts for three-year dues payments; 5) and conducting membership and prospect surveys.

Khalil believes it is important to increase the voice and the level of involvement of the members within APS. The third goal is to develop plans with other APS committees to increase the participation of the new members in the nomination and selection of APS sections officers and committees and also in the selection of APS meetings' dates and sites. To achieve this goal, the chair suggests rapid methods to vote, for example, by using electronic vote.

The fourth goal is to increase the involvement of young scientists in APS. This goal can be achieved by: 1) increasing the recruitment efforts among undergraduate and graduate students; 2) consulting with other members to help recruit young scientists and provide suggestions as to how to increase the membership of young scientists; 3) reevaluating the criteria of young members and develop plans for more flexible review of applications from young scientists; 4) proposing plans to include one graduate student or postdoctoral fellow in the Membership Committee.

Khalil and the Membership Committee are committed to these initiatives. The collective goal is to invigorate the membership recruitment and retention efforts, and establish a template for the active involvement of current members of APS to promote and enhance the membership in the society. ❖

## Introducing...Pat Preisig

On January 1, 2002 **Pat Preisig** succeeded **Tom Peterson** as Chair of the APS Awards Committee. Preisig had served as a member of the Committee for three years before becoming Chair. As Chair, Preisig and the Committee will review applications and select recipients for the APS Young Investigator Awards (Arthur C. Guyton award, Shih-Chun Wang award, Lazaro J. Mandel award), Postdoctoral Fellowships in Physiological Genomics, and Research and Teaching Career Enhancements Awards. In addition, the committee is involved in an on-going process of reviewing and improving the APS awards program.

Preisig is a Professor in the Department of Medicine, Division of Nephrology, at the University of Texas Southwestern Medical Center in Dallas, TX. She received her doctoral degree in Organ System Physiology from the University of San Francisco in 1983, where her focus was renal physiology. Her graduate work examined the pathways of water reabsorption in the proximal tubule of the nephron and was completed under the direction of Christine Berry and Floyd C. Rector, Jr. After spending four years on the faculty, she moved to the University of Texas Southwestern Medical School in 1987.

Preisig's research now focuses on 1) acid regulation of the proximal tubule Na/H antiporter isoform, NHE3, and the Na dicarboxylic acid transporter, NaDC-1; and 2) the regulation of proximal tubule growth. The former work, which is the product of a long-standing collaboration with Bob Alpern, has elucidated a number of signaling intermediates that are necessary for decreases in cell pH to increased acid secretion by the proximal tubule. By using transgenic mice in which endothelin B receptor expression has been disrupted in the kidney, they have shown that endothelin 1 working through the endothelin B, but not endothelin A receptor mediates the upregulation of NHE3 activity in response to a decrease in cell pH. The



**Pat Preisig**

initial increase in NHE3 activity is due to trafficking of NHE3 to the apical membrane of the proximal tubule cell, followed by a chronic regulation that includes increased expression of whole cell NHE3. They have identified a segment of the 2nd intracellular loop of the endothelin B receptor and the C-terminal tail as being necessary for endothelin 1 regulation of NHE3. They have also discovered that the tyrosine kinase Pyk2 appears to be the pH-sensor that initiates the signaling cascade leading to acid-induced NHE3 regulation.

Preisig's research on renal growth initially focused on identifying the mechanism by which proximal tubule epithelial cells hypertrophy. Proximal tubule hypertrophy is characteristic of conditions such as the loss of renal mass, diabetes mellitus, and electrolyte disorders, such as chronic metabolic acidosis and potassium deficiency. She was the first to determine that there are two mechanisms by which proximal tubule cells can be induced to hypertrophy. One is cell cycle-dependent in that it involves regulation of the cell cycle kinases and cyclin kinase inhibitors that mediate progression through the G1 phase of the cell cycle. This mechanism is mitogen dependent, requiring that hypertrophied cells enter G1 and then experience cell cycle arrest in the late G1

phase of the cell cycle. The second mechanism is cell cycle-independent. This mechanism involves alkalization of acidic intravesicular compartments in the cell, which disrupts the balance between rates of protein synthesis and protein degradation.

Her current work in this area is to identify which hypertrophy mechanism is involved in *in vivo* conditions. She has shown that the proximal tubule hypertrophy associated with loss of renal mass (uninephrectomy) and diabetes mellitus is due to the cell cycle-dependent mechanism. In uninephrectomy-induced, but not diabetes-induced proximal tubule hypertrophy, endothelin 1 working through the endothelin B receptor provides the mitogen signal necessary to activate the hypertrophic growth process.

In addition to her research, Preisig is involved in a number of other professional activities. She currently is the Chair of the Basic Science Research Committee of the American Society of Nephrology, a member of the Executive Committee of the Kidney in Cardiovascular Disease Council of the American Heart Association, Editor of the *Women in Nephrology* newsletter, a member of the Executive Committee of Women in Nephrology, co-editor of the Renal Pathophysiology section of "Current Opinions" in *Nephrology and Hypertension*, and a member of the Editorial Board of the *Journal of the American Society of Nephrology*. She has served as the secretary of the Renal Section of the APS, been a member of the Programming Committee for the American Society of Nephrology, and organized a Forefronts in Nephrology conference for the International Society of Nephrology.

Preisig has set several goals for the Committee. Some of these will be done within the Committee and some in conjunction with other APS working groups. The APS Strategic Plan has identified several goals for the APS awards programs. Preisig and the

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Committee will address those that pertain to their function.

This year the Committee is focusing on establishing written criteria for evaluating the applications for each award. This document will be used by each reviewer and will serve to introduce new Committee members to the review process. Their goal is to consistently identify the top application(s) for funding. This year the review process has been changed to be more like an NIH study section, except that they have not triaged applications.

With financial support from the APS, the Postdoctoral Fellowship stipend has been increased to stay in line with the new NIH stipends. APS's goal is to make their Postdoctoral Fellowship the premiere fellowship, and thus, will increase the stipends over the next few years so that they are consistently a little above those offered by the NIH.

A number of new awards, particularly for junior investigators, are being discussed. These will be presented to the APS Council at their summer meeting. In addition, there are discus-

sions to expand the breath of the Postdoctoral Fellowships. Currently the three fellowships awarded are in Physiological Genomics. A task force established last year to review the whole APS awards program will present a recommendation to Council to increase the number of fellowships and include other focus topics. Hopefully, these changes in the awards program can be put in place next year. ❖

## Introducing...Curt D. Sigmund

On January 1, 2002, **Curt D. Sigmund** succeeded **Judith Neubauer** as Chair of the APS Joint Program Committee (JPC). As Chair, Sigmund will also serve ex officio on the APS Council. Sigmund previously served on the JPC as an at large member appointed by then President **Allen Cowley** and then served as the representative to the newly formed Physiological Genomics Interest group. In 1997 Sigmund served on a Blue Ribbon Panel to develop and implement a strategic plan for APS programming, and is a member of the Physiological Genomics Task Force.

Sigmund is Professor of Medicine and Physiology and Biophysics in the Roy J. and Lucille A. Carver College of Medicine at the University of Iowa in Iowa City, IA. He received his undergraduate education at the State University of New York in Buffalo, NY, and his PhD in Molecular and Cellular Biology from the same institution in 1987. He completed postdoctoral training at Roswell Park Cancer Institute under the mentorship of Kenneth W. Gross. In 1991 he joined the Departments of Medicine and Physiology and Biophysics at the University of Iowa.

Sigmund's research focuses on the molecular biology and genetics of the



**Curt D. Sigmund**

renin-angiotensin system with a particular emphasis on the development of transgenic mouse models to study the role of tissue renin-angiotensin in hypertension. His research awards include the Henry Christian Award for Excellence in Clinical Research from the American Federation for Clinical Research, American Society of Hypertension/Hoechst Marion Roussel 1997 Young Scholars Award, and in 2000 received the Henry Pickering Bowditch Award Lecture of the

American Physiological Society at Experimental Biology 2000. His over 100 publications include the first paper accepted for publication in the APS Journal—*Physiological Genomics*, which provided the first genetic evidence that abnormalities in renal angiotensin-II levels can cause hypertension even when circulating levels of angiotensin-II are normal. Sigmund was recently appointed Director of the Carver Research Program of Excellence in the Functional Genomics of Hypertension and Cardiovascular Diseases at the University of Iowa.

In addition to his service on the JPC, Sigmund was previously an Associate Editor of *AJP: Endocrinology and Metabolism*, and is currently an Editor of *Physiological Genomics*. He is also an Associate Editor of the American Heart Association journal, *Hypertension*, and is a regular member of the Cardiovascular and Renal Study section at the NIH.

The Joint Program Committee is charged with developing the scientific programs for the Society, including the APS program at Experimental Biology, APS Conferences, and Inter-Society Conferences. The committee also assists the APS Council in shaping policy for scientific programs. ❖

## Physiological Genomics of Cardiovascular Disease: From Technology to Physiology February 20-23, San Francisco, CA

Fisherman's Wharf, Golden Gate Park, Chinatown, Union Square and cable cars served as the backdrop for the Society's first annual conference on Physiological Genomics. The meeting entitled, "Physiological Genomics of Cardiovascular Disease: From Technology to Physiology," organized by Curt D. Sigmund (Chair) was held Wednesday, February 20 through Saturday, February 23 at the Cathedral Hill Hotel in the Van Ness neighborhood of San Francisco, CA

The conference focused on the technologies, tools and applications currently available in physiological genomics and how to translate this information to the study of cardiovascular disease. There was extensive interaction between investigators studying molecular genetics, genomics and physiology in model organisms.

The conference attracted 205 registrants 22% (46) of which were female and 30% of which represented young scientists, including 33 students and 28 postdoctoral registrants. Forty-eight (23%) were APS members and 69 (34%) were not members of APS. Twenty-six (13%) represented invited speakers and session chairs. Of the total registrants, 38 (18%) were from outside The Americas; 25 (11%) were from industry and 7 (3%) were from US government labs.

The outstanding program consisted of six symposia, a keynote lecture featuring Francis Collins of the National Human Genome Research Institute and six poster sessions that included a total of 78 poster presentations. Included in the registration fee was an

Opening Reception on Wednesday evening following the keynote lecture and receptions during the Thursday and Friday poster sessions from 4:00-6:00 pm. The meeting closed at 4:00 pm on Saturday, February 23.

**Carmen Padro**, **Marcos Eche-garay**, and **Miguel Rivera** all from the University of Puerto Rico were recipients of the Porter Physiology Development Committee's Minority Travel Fellowship Award. These awards are provided to encourage participation of under-represented minority students. With support from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the National Institute of General Medical Sciences (NIGMS) the fellowship provides reimbursement of all expenses associated with travel to and participation in the conference. The recipient is matched with an APS member attending the conference who offers guidance and makes introductions to other scientists.

Travel awards were granted to 18 abstract presenters. The awardees received reimbursement of travel expenses up to \$1,500 and were scheduled for short oral presentations during an appropriate symposium. The awardees were: **Masahiko Akiyama**, Mayo Clinic & Foundation, "In vivo gene transfer of recombinant S1179DeNOS to basilar artery"; **Sergey V. Anisimov**, National Institute on Aging, NIH, "Quantitative transcriptome analysis of the adult mouse heart using serial analysis of gene expression"; **Burns C. Blaxall**, Duke University, "Differential gene expression and genomic patient stratification following left ventricular assist device support in humans"; **Arnaud Chambellan**, INSERM, Nantes, France, "Transcriptome modulation induced by chronic amiodarone in the mouse heart"; **Flavien Charpentier**, INSERM, Nantes, France, "Altered thyroid function induces a complex remodeling of the cardiac ion channel transcriptome"; **Kam Dawnell Dahlquist**, Gladstone

Institute of Cardiovascular Disease, UCSF, "GenMAPP: a new tool for viewing and analyzing microarray data on biological pathways"; **Ulrich Frey**, University of Essen, Germany, "Increased hemodynamic response to clonidine in subjects carrying the 825T-allele of the G protein  $\beta 3$  subunit"; **Jan L.M.C. Geelen**, University of Maastricht, The Netherlands, "Temperature-sensitive rescue of a dominant-negative HERG mutant"; **Taren M. Grass**, University of Montana, "Growth factor expression in growth and remodeling of coronary angiogenesis"; **Kevin A. Greer**, University of Arizona, "A comparison of hierarchical clustering algorithms on simulated microarray data"; **Matthew J. Huntelman**, University of Florida, "Effective lentivector-mediated transduction of the neonatal cardiovascular system"; **Junichiro Miake**, Johns Hopkins University, "Functional role of inward rectifier potassium current  $I_{K1}$  in cardiac excitability"; **Brian Petrich**, University of Maryland, Baltimore, "Cre-loxP mediated gene-switch system targeted in heart to study regulation of cardiac remodeling and development of cardiomyopathy by c-Jun N-terminal kinase activation"; **Marja Steenman**, INSERM, Nantes, France, "Global gene transcription in failing and non-failing human hearts: developmental, dedifferentiated and apoptotic gene expression"; **Winfried Siffert**, University Hospital, Essen, Germany, "G protein  $\beta 3$  subunit C825T polymorphism is a strong pharmacogenetic predictor of weight reduction under therapy with sibutramine (Meridia)"; **Ruchira Sood**, Stanford University, "Exploring gene expression in human placenta using DNA microarrays"; **Whittemore G. Tingley**, Gladstone Institute of Cardiovascular Disease, University of California, San Francisco, "Expression profiles of 4,351 mouse genes in hypertrophic and dilated cardiomyopathy"; and **Ruey-Bing Yang**, COR Therapeutics,

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**Table 1. Registration Statistics**

	No.	%
APS Member	48	23
Emeritus Member	1	<1
Nonmember	69	69
Postdoctoral	28	14
Student	33	16
Invited Speaker	26	13
Total	205	100

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Inc., "Molecular profile of human endothelium revealed by large-scale expression profiling analyses."

A total of 78 abstracts were submitted to the conference for poster presentation. Twelve percent (18) of the

total submitted abstracts had female first authors; 32% (25) were from outside The Americas; 10% (8) were submitted from researchers working in industry, and 6% (5) were submitted from US government laboratories.

The Society and Conference

Organizers gratefully recognize the financial support provided through unrestricted educational grants from Burroughs Wellcome Fund, Glaxo-SmithKline Pharmaceuticals, and Pfizer Global Research & Development. ❖

## Membership

### New Regular Members

\*Transferred from Student Membership

**Leslie Weston Abad**

Schering-Plough Research Inst.

**Walid M. Al-Ghoul**

Loyola Univ., Chicago

**Rehab Al-Jamal**

Univ. of Edinburgh, Scotland

**Florin Amzica**

Laval Univ. School of Med., Canada

**Perry S. Barboza**

Univ. of Alaska, Fairbanks

**Lambertus Benthem**

7TM Pharma A/S, Denmark

**Matthew Bjerknes**

Univ. of Toronto, Canada

**Antonella Bona**

Greater Hartford Academy of Math and Sciences, CT

**Steven C. Borkan**

Boston Medical Center, MA

**Jill Ann Bush\***

Univ. of Houston, TX

**Ya-Fei Chen**

Medical College of Wisconsin

**Ping Cheng**

Univ. of Texas Southwestern Med. Ctr.

**Raymond T.F. Cheung\***

Univ. of Hong Kong

**Marcel A. Costuleanu**

Univ. of Med. and Pharmacy, Romania

**Anna Csiszar**

New York Medical College

**Asad D. Dalia**

Univ. of Cincinnati, OH

**Paul Dean**

Univ. of Sheffield, England

**Vondolee M. Dilgado-Nixon**

Ohio State Univ.

**Urban J.A. D'Souza**

Univ. of Sains, Malaysia

**Allen Charles Eaves**

Terry Fox Laboratory, Canada

**Kouhei Fukushima**

Tohoku Univ. Japan

**Clifford T. Fulton\***

Univ. of Southern Indiana

**Philip M. Gallagher\***

Ball State Univ., IN

**Michael R. Garrett**

Medical College of Ohio

**Orlando Gonzalez\***

Univ. of Puerto Rico, Bayamon

**Paul Andrew Gray**

Univ. of California, Los Angeles

**Bulent Gumusel**

Hacettepe Univ., Turkey

**Milind V. Gurjar\***

Univ. of Iowa

**Karen E. Hall**

Ann Arbor VA Health System, MI

**Joel C. Heimann**

Univ. of Sao Paulo, Brazil

**Wei Huang**

Univ. of California, San Diego

**Chunhua Jiao**

Univ. of Iowa

**Prasad V.G. Katakam\***

Mayo Clinic, Rochester, MN

**Christos S. Katsanos\***

Univ. of Texas Medical Center

**Mohammad Khaksari Haddad**

Rafsanjan Medical Faculty, Iran

**Scot C. Leary\***

Montreal Neurogenetics Inst., Canada

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Sanofi-Synthelabo Recherche, France

**Sergio Masetto**

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**Michael Minnicozzi**

Schering Plough Research Inst., NJ

**Dilip Krishna Murthy**

Int'l Center for Health Sci., India

**Vinod Narra**

Brigham and Women's Hospital, Harvard, MA

**Grazyna Nowak**

Univ. of Arkansas

**Monique L. Ogletree-Hughes\***

Cleveland Clinic Foundation, OH

**Ming Ouyang**

Univ. of Pennsylvania

**Jeppe Praetorius\***

Aarhus Univ., Denmark

**Siriwan Prapong\***

Kasetsart Univ., Thailand

**April Elizabeth Ronca**

NASA Ames Research Center, CA

**Kimberly D. Ryder\***

New York Chiropractic College

**Angus G. Scrimgeour**

US Army Res. Inst. Env. Med., MA

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Harvard Medical School, MA

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**Darren Paul Wallace\***

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**Jos P.M. Wesselman**

Maastricht Univ., Netherlands

**Ying Xia**

Yale Univ., CT

**Qiang Xie\***

Indiana Univ.

**Xiao-Song Zhao**

Univ. of Texas Southwestern Med. Ctr

**Adrienne S. Zion**

Bronx VA Medical Center, NY



## New Student Members

**Karan S. Aboudehen**

Southeastern Louisiana Univ.

**Sofia V Andersson**

Univ. of Kalmar, Sweden

**Christopher D. Askew**

Univ. of Queensland, Australia

**Lisa Bevilacqua**

Univ. of Ottawa, Canada

**Arlin B. Blood**

Loma Linda Univ., CA

**Marcelo Catalan**

Centro De Estudios Cientificos, Chile

**Christa C. Chatten**

Univ. of Waterloo, Canada

**James Allen Coles**

Univ. of Minnesota

**Sheila R.M. Costford**

Univ. of Ottawa, Canada

**Marie-Cecile De Cian**

Station Biologique, France

**Steven G. Denniss**

Univ. of Waterloo, Canada

**Keith Jason DiPetrillo**

Dartmouth Medical School, NH

**Stephanie MR Duguez**

Univ. of Jean Monnet, France

**Jaafar Fadl El Annan**

Massachusetts General Hospital

**Ahmed A. Elmarakby**

Medical College of Georgia

**Deborah Miriam Fine**

Univ. of Minnesota

**Stephen Paul Gagnon**

Florida State Univ.

**Drew Aaron Graham**

Univ. of Waterloo, Canada

**Tim Edward Higham**

Univ. of Cincinnati, Ohio

**Hongzhen Hu**

Ohio State Univ.

**Sylvia Young Kim**

Univ. of Maryland

**Rafael A. Leos**

New Mexico State Univ.

**Dianne Little**

North Carolina State Univ.

**Samantha Louey**

Monash Univ, Australia

**Oliver Patrick Love**

Simon Fraser Univ.

**Deepa S. Maharaj**

Rhodes Univ.

**Paul John Marvar**

West Virginia Univ.

**Todd J. McWhorter**

Univ. of Arizona

**Adam J. Moeser**

North Carolina State Univ.

**Shihabudheen Mohammed**

Gulf Medical College, Ajman United Arab Emirates

**Jennifer Kay Ormerod**

Florida State Univ.

**Julie P. Richmond**

Univ. of Alaska, Anchorage

**Lara Michelle Roberts**

Florida State Univ.

**Katrina Gotia Salvante**

Simon Fraser Univ., Canada

**J. S. Sorensen-Forbey**

Univ. of Utah

**Amanda L. Southwood**

Univ. of British Columbia, Canada

**Karen Leanna Sweazea**

Univ. of Arizona

**Julia E. Tomunson**

North Carolina State Univ.

**Francois Vezina**

Simon Fraser Univ., Canada

**Ting Wang**

Univ. of Texas Medical Branch

**Penolope Strauss Villars**

UTHSC, Houston

**Russell S. Witte**

Arizona State Univ.

**Claudio Cesar Zoppi**

Univ. of Campinas, Brazil

## New Affiliate Member

**Helaine Joy Burstein**

Ohio Univ.

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

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([http://www.the-aps.org/careers/car\\_pos\\_avail.htm](http://www.the-aps.org/careers/car_pos_avail.htm)), the following items are needed: a copy of the ad, the name of a contact person, and either a purchase order number, credit card number (with expiration date and name of cardholder) or billing address. Send the information to Linda Comley (Email: [lcomley@the-aps.org](mailto:lcomley@the-aps.org); Tel: 301-634-7165; Fax: 301-634-7242).

## Congress Excludes Rats, Mice and Birds from AWA

When President Bush signed the farm bill into law on May 13, 2002, he also approved a provision that will permanently exclude rats, mice, and birds from USDA oversight under the Animal Welfare Act (AWA). Congress gave its final approval to the legislation in early May.

The bill was signed into law three months after Sen. Jesse Helms (R-NC) proposed the language to write into law the administrative exclusion of rats, mice, and birds from the AWA that has been in place for 30 years. The Senate approved the measure by unanimous consent on February 12. Without this provision, the USDA would have been required to extend the AWA regulations to cover these species. Research advocates argued that the majority of rats, mice, and birds in biomedical research are found in institutions where USDA regulations would duplicate the oversight already provided by the Public Health Service Policy on Humane Care and Use of Animals, the Good Laboratory Practices Act, and the Association for Assessment and Accreditation of Laboratory Animal Care. Given the large numbers of rats and mice used in research, the additional regulations would have added enormous cost and administrative burden without improving welfare for these animals.

Although the Senate adopted the Helms amendment by unanimous consent, the House version of the farm bill did not contain comparable language, which meant that the House-Senate conference committee had to decide whether the provision would go into the final bill. However, this was minor compared to the differences in programs and costs the conferees had to work out between the House and Senate bills. These negotiations began in February, but it was not until the end of April that the conferees announced that they had reached agreement. Shortly thereafter research advocates confirmed that the Helms language was included in the

final bill. Controversy still dogged the legislation because the Congressional Budget Office estimated its cost at \$83 billion, nearly \$10 billion more than what was budgeted for farm programs. Nevertheless, the House approved the conference agreement on May 2, and the Senate followed suit on May 8. President Bush was expected to sign the measure into law.

The Helms amendment was needed to resolve the question of whether the USDA should regulate rats, mice, and birds under the AWA. The USDA was required to issue a proposed rule for the regulation of these species to comply with the agreement the agency reached with the Alternatives Research and Development Foundation (ARDF) in September 2000 as part of an out-of-court settlement of a lawsuit over the USDA's past exclusion of rats, mice, and birds from the AWA.

However, the USDA was prevented from issuing a proposed rule from October 1, 2000 through September 30, 2001 because Congress had placed a temporary spending moratorium on making the change. Animal activists conducted a vociferous campaign against the moratorium, and in this year's appropriations legislation, Congress allowed it to lapse. Instead, the USDA was allowed to formulate a rule, but it could not go into effect before October 1, 2002.

Animal activist organizations sought to mobilize their members and lobbyists to block inclusion of the Helms language in the farm bill. ARDF Executive Director John McArdle accused "biomedical research lobbyists" of conducting "a concerted campaign of misinformation" and claimed that the lack of USDA oversight would cause "severe set-backs for the welfare of animals in laboratories and for the quality of the research conducted in those laboratories." Meanwhile, the American Anti-Vivisection Society announced plans for "Campaign 50," in which animal activist organizations would "work for the passage of legislation in all 50 states to provide the protection Helms has denied to these tens and millions of animals," according to Executive

Director Tina Nelson. The McArdle and Nelson statements were included in a joint press release in which the ARDF was described as the "scientific affiliate" of the AAVS.

The farm bill conference agreement also calls for a National Academies of Science study on rats, mice, and birds in research to be conducted during the next year. The study is to estimate how many rats, mice, and birds used in research and determine the extent to which other regulatory oversight already applies to them. The study is also to provide an estimate of the additional cost to the USDA, research institutions, and breeders if the USDA were to regulate rats, mice and birds in some fashion and make recommendations how to minimize the regulatory burden of redundant oversight of animal research.

Another provision that would have established standards for so-called "puppy mills" was dropped from the final farm bill. That measure, sponsored by Sen. Rick Santorum (R-PA), would have imposed requirements for socialization and restricted how often female dogs could be bred. Researchers opposed this provision because the socialization requirements were not grounded in science and would have interfered with the ability of laboratory animal veterinarians to exercise professional judgment. The American Kennel Club and many hobby breeders of dogs opposed the legislation because of the arbitrary socialization requirements and also because they objected to a law that would determine how often a dog could be bred. ♦

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## APS Press Room at EB 2002

The APS highlighted physiological research through its Press Room at this year's Experimental Biology meeting. Operated by Communications Office staff, the Press Room served as the headquarters for the Society's media relations efforts.

Media consultant Donna Krupa wrote press releases for 27 of approximately 3,000 abstracts submitted

through the APS. The releases were distributed to local and national media. At EB, the Press Room staff acted as a liaison between reporters and scientists by fielding press queries, setting up interviews and tracking media coverage.

Our efforts were met with enthusiasm from both the media and the participating scientists. By the end of the meeting, the APS Press Room had been queried by *CNN*, the *New York Times*, the *Times-Picayune*, *WebMD* and the *CBS Radio Network*. Though results are still being tallied, the response received has been encouraging and suggests that public interest and awareness of physiological research will continue to grow in years to come. ❖

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## Hatch Supports Therapeutic Cloning

On May 2, 2002 the biomedical research community got a major boost in the fight to allow human cloning for therapeutic purposes. Speaking at a press conference, Orrin Hatch (R-UT), a conservative Republican generally known for pro-life views, announced his support for a bill that would outlaw reproductive cloning while allowing the cloning of human embryos for research purposes.

"In the weeks ahead, the United States Senate will debate an issue that is of extreme importance to millions of Americans suffering from disease," Hatch said. "The challenge before Congress is two-fold. We must craft a law to make sure that human beings are not cloned. At the same time, we must not stand in the way of scientific advances that hold the promise of treatments and cures for literally millions of Americans."

Senator Hatch is co-sponsoring a bill with Senators Dianne Feinstein (D-CA), Ted Kennedy (D-MA) and Arlen Specter (R-PA). S. 2439, the Human Cloning Prohibition Act of

2002, aims to outlaw the cloning of human embryos to produce children while still allowing cloning techniques to produce stem cells. S. 2439 is similar to an earlier bill, S. 1758, sponsored by Senators Feinstein and Kennedy, which FASEB endorsed last year. This legislation, if enacted, would impose civil and criminal penalties for anyone who violates the ban on reproductive cloning. It also contains certain features of another bill sponsored by Senators Specter and Tom Harkin (D-IA).

A press release on Senator Hatch's announcement can be found online at: <http://hatch.senate.gov/pressapp/record.cfm?id=182533>. ❖

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## Zerhouni Confirmed as NIH Head

On May 2, 2002 the Senate confirmed Elias Zerhouni to be the next Director of the NIH. The full Senate vote on Zerhouni's nomination came immediately after the Senate Health, Education, Labor, and Pensions (HELP) Committee approved his nomination, making his confirmation the quickest of the last three NIH chiefs.

Earlier in the day, the HELP Committee held a confirmation hearing for Zerhouni who received high praise from both Republicans and Democrats on the committee.

During his testimony, Zerhouni said his foremost priority if confirmed would be to recruit top scientists to fill key appointments within the agency. Currently, five institutes lack permanent directors. Zerhouni also mentioned the need for translational research. "We need to bring the fruits of our research to clinical testing more rapidly and enhance our ability to prevent and detect disease much earlier." One issue of concern has been Zerhouni's position on stem cell research. During his confirmation hearing, Zerhouni avoided making any specific references to the technology instead saying "the NIH Director

should actively promote necessary research within the policy guidelines laid out by the president and in strict compliance with all laws passed by Congress." Transcripts from the hearing can be found on the APS website at: <http://www.the-aps.org/news/Zerhouni-Trans.htm>.

Zerhouni's most recent position was the Executive Vice Dean of the Johns Hopkins University School of Medicine, Chairman of the Russell Morgan Department of Radiology and Radiological Science at Johns Hopkins and as Professor of Radiology and Biomedical Engineering. He also served as Vice Dean for Research at The Johns Hopkins University School of Medicine. He is a member of the National Cancer Institute's Board of Scientific Advisors and a co-founder of Surgi-Vision, a company based in Gaithersburg, MD that develops and markets magnetic resonance imaging technologies for use in diagnostic procedures.

Those close to Zerhouni say in addition to being a talented researcher, he is also a gifted manager. Zerhouni, they say, is that rare individual who can speak the arcane language of theoretical science, extract millions of dollars from wealthy supporters and navigate the treacherous political waters of academe. "He knows as much about finance as he does about faculty issues and strategic plans for clinical practice," said Edward Miller, the dean of Johns Hopkins School of Medicine and Chief Executive of Hopkins Medicine. "He is very results-oriented."

Zerhouni is known in the medical community as a "translational scientist" for his efforts to bridge the gap between fundamental laboratory discoveries and practical applications for treating patients. He developed a myocardial tagging procedure that enables doctors to place invisible marks on the heart and monitor its movement, a procedure that helps physicians determine how disease affects the heart. ❖

## NIH Releases Medical School Funding Data

The National Institutes of Health (NIH) Office of Extramural Research has released data on the distribution of NIH grant funds. This data is broken down by medical school departments and ranks universities by the number of awards received.

Table 1 below represents aggregated data for eight categories of medical school departments. It compares the total number of awards, including research grants, training grants, fellowships, R&D contracts and other awards. It also shows total funding in each category for fiscal year 2001 and 2002.

In fiscal year 2001, Departments of Physiology received 1,404 awards totaling \$420,528,104. This represented a .57% increase in awarding from fiscal year 2000 and a 8.6% increase in funding over fiscal year 2000.

According to the latest numbers, Departments of Physiology ranked fourth out of the eight departments in terms of total number of awards and third in terms of overall monetary awards.

The complete set of data for these departments can be found on the NIH website. Data for fiscal year 2001 can be accessed at <http://silk.nih.gov/public/cbz2zoz.@www.rank01.medrnk.htm>. Data for fiscal year 2000 can be found at: <http://silk.nih.gov/public/cbz2zoz.@www.medschd.fy2000.htm>. ❖

will provide funds totaling \$73,000 to each of the three winning scientists, including a stipend and a mini-research grant for each year.

The aim of this program is to advance the study of physiological genomics by furthering understanding of the genome in the context of the organism. This program was established to provide training that will enable outstanding young scientists to combine the tools of cellular and molecular biology in the setting of the whole animal.

The 2002 award winners are: Ana Diez-Sampedro, (University of California, Los Angeles School of Medicine); Malcolm A. Lyons, (The Jackson Laboratory); and Brian R. Wamhoff, (University of Virginia).

## APS Awards More Than \$200,000 to 2002 Postdoctoral Fellowship Winners

The American Physiological Society has announced the winners of its 2002 Postdoctoral Fellowships in Physiological Genomics. The two-year award

**Table 1. Distribution of NIH Grant Funds by Department**

Department	Total Number Awards (FY 2001)	Total Number Awards (FY 2000)	% Change from FY 2000	Total Funding (FY 2001)	Total Funding (FY 2000)	% Change from FY 2000
Anatomy	1,194	1,117	6.8	366,476,259	306,609,853	19.5
Biochemistry	1,608	1,474	9	483,743,071	416,390,111	16.1
Genetics	684	610	12	330,146,457	270,009,061	22.2
Microbiology	1,481	1,441	2.7	419,572,946	386,927,301	8.4
Other Basic Science	432	370	16.7	136,273,634	100,800,293	35.1
Pharmacology	1,450	1,319	9.9	396,695,153	338,449,996	17.2
Physiology	1,404	1,396	0.57	420,528,104	386,777,060	8.6
Pathology	1,397	1,308	6.8	456,972,739	403,542,577	13.2

## APS Sustaining Associate Members

*The Society gratefully acknowledges the contributions received from Sustaining Members in support of the Society's goals and objectives.*



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## Research Positions

**Research Scientist/Postdoctoral Fellow:** Research Scientist/Postdoctoral Fellow positions are available in the Cardiovascular Disease Research Program in the Biomedical/Biotechnology Research Institute at North Carolina Central University. Ongoing projects in the program include analysis of perivascular sensory nerve function in resistance arteries, exploration of the neuroimmune system in the vascular wall, molecular pharmacology of the endogenous cannabinoid system and Ca<sup>2+</sup> sensing receptor physiology and pharmacology. Interested individuals should possess a PhD and/or MD and submit curriculum vitae, description of research interests and career goals, and names and addresses of three references to Richard Bukoski, PhD, Biomedical/Biotechnology Research Institute, North Carolina Central University, 700 George Street, Durham, NC 27707. North Carolina Central University is a constituent institution of the University of North Carolina system and an Equal Opportunity/Affirmative Action Employer. NCCU complies with the Immigration Reform and Control Act of 1986.

**Research Scientists:** The Merck Research Laboratories (MRL) division of Merck & Co., Inc., a world leader in biomedical research seeks to attract a select number of scientists with proven expertise and excellence in animal physiology and pharmacology. The *in vivo* specialists we seek will participate in drug discovery programs at our state-of-the-art research facilities in the USA, Canada, and the United Kingdom. They will explore the full range of therapeutic opportunities in central nervous system disorders, obesity, diabetes, atherosclerosis, cancer, infectious diseases and diseases affecting cardiovascular, pulmonary, urogenital, ocular, endocrine and immune function. Applicants may be drawn from disciplines that include, but are not limited to Pharmacology, Physiology, Neurosciences, Psychology and Veterinary Medicine, but must

have significant expertise in *in vivo* techniques. Candidates preferably will have postdoctoral experience, a superior record of accomplishment in biomedical research as evidenced by a strong publication record, and excellent communication skills. We seek individuals who share our core research values and vision in the development of innovative medicines for the treatment of disease. Our salaries, benefits and growth potential are excellent. Applicants interested in working at any of our sites should send electronic (MS Word document) versions of their CV (including names and addresses of three potential references), a statement describing their research interests, and their preference, if any, with respect to work location to Neyda Conklin ([neyda\\_conklin@merck.com](mailto:neyda_conklin@merck.com)). Please reference this ad in the subject line. [EOE]

**Position in Physiology:** A position is available to study the physiology and cell biology of the human malaria parasite *Plasmodium falciparum*. The main focus of the research will be to join projects into metabolite transport, drug resistance phenomena, protein targeting, as well as Ca<sup>2+</sup> signaling, using fluorescence live cell microscopy. Candidates should have an MD or PhD degree, and a strong background in physiology and experience with single cell measurements of pH and Ca<sup>2+</sup> using video imaging and confocal microscopy. The group is in newly refurbished lab space and equipped with a Zeiss LSM510 confocal microscope, as well as a video fluorescence imaging system, both for single cell measurements under physiological conditions. The salary scale is BAT IIa/Ib. Habilitation is possible. Applications should be sent until **June 15, 2002** to Dr. Michael Lanzer, Abteilung Parasitologie, Im Neuenheimer Feld 324, 69120 Heidelberg, Germany. Email: [Michael\\_Lanzer@med.uni-heidelberg.de](mailto:Michael_Lanzer@med.uni-heidelberg.de).

**Research Associate:** Wayne State University School of Medicine, Department of Physiology has available positions of Research Associate in Neurophysiology. Positions require

individuals with a Doctor of Medicine (MD), or PhD in Neuroscience/Neurophysiology. The successful candidates should also have research experience in performing surgery on rats or cats or dogs to study synaptic interactions between viscerosensory nerves as evidenced by work experience or one research publication that appeared in a peer-reviewed journal. Job duties include conducting research to study cardiovascular and respiratory neural control during exercise that will examine synaptic interactions between viscerosensory nerves, performing surgery on anesthetized rats, cats and dogs, acquiring and analyzing data, including statistical analyses, performing immunohistochemical staining of brainstem and spinal cord tissues, assisting in manuscript preparation for professional publication, training and supervising undergraduate students and research technicians in day-to-day operations of laboratory, and other duties as assigned. To learn more about research conducted in my laboratory please visit our website at <http://www.med.wayne.edu/pottslab>. Qualified applicants should send resume and three letters of reference to Jeffrey T. Potts, PhD, Assistant Professor, Department of Physiology, Wayne State University School of Medicine, 540 E. Canfield Ave., Detroit, MI 48201. [EOE]

**Research Investigator:** The Department of Internal Medicine, Division of Cardiovascular Diseases at the University of Iowa College of Medicine is seeking a Research Investigator to perform basic research related to identifying mechanisms of action of transcriptional regulation, using techniques of molecular biology, molecular genetics, tissue culture, and protein biochemistry. The candidate will be responsible for these functions, as well as for the completeness and accuracy of the research work. Requires a person in this classification has the academic knowledge of a discipline generally associated with the equivalent of a Doctoral degree, or has completed all the requirements for receipt of such a degree. Desires a PhD in biological sciences, along with spe-

cific expertise in the areas of transcriptional regulation, molecular biology, and biochemistry. Please send resume and cover letter indicating #44634 to: Carol Wehby, Human Resources, Internal Medicine, The University of Iowa, E400 GH, 200 Hawkins Drive, Iowa City, IA, 52242-1081. The University of Iowa is an Equal Opportunity and Affirmative Action employer. Women and minorities are strongly encouraged to apply.

**Research Investigator:** The Department of Internal Medicine, Division of Pulmonary, Critical Care and Occupational Medicine at the University of Iowa College of Medicine is seeking a Research Investigator to perform basic research related to identifying the molecular mechanisms regulating gene expression of critical proteins involved in lung injury using routine molecular biology, molecular gene transfer, and protein chemistry approaches to follow protein expression *vivo* and *in vitro*. Also, to utilize mouse models to assess regulatory mechanisms and biologic significance of key enzymes involved in lung injury *vivo*. The candidate will be responsible for these functions, as well as for the completeness and accuracy of the research work. Requires a person in this classification has the academic knowledge of a discipline generally associated with the equivalent of a Doctoral degree, or has completed all the requirements for receipt of such a degree. Desires experience with animal handling and transgenic mice, immunological methods, molecular biology and protein chemistry, tissue culture, confocal and standard fluorescent microscopy, and EM histology. Please send resume and cover letter indicating #44635 to: Carol Wehby, Human Resources, Internal Medicine, The University of Iowa, E400 GH, 200 Hawkins Drive, Iowa City, IA, 52242-1081. The University of Iowa is an Equal Opportunity and Affirmative Action employer. Women and minorities are strongly encouraged to apply.

**Senior Research Associate/Technician:** The Department of Neurology, The Joseph Stokes Jr. Research

Institute, The Children's Hospital of Philadelphia, is seeking a Senior Research Associate/Technician. The successful candidate will have a strong background and interest in DNA and RNA manipulations along with protein experience. One of the duties of the position will be working with transgenic mouse models. The occupant of this position will be required to supervise students and research technicians in a variety of related projects. You will demonstrate a high level of initiative in performing experiments, particularly when problems are encountered which require troubleshooting. Candidates should have a Master's degree in biology, chemistry, biochemistry, neuroscience, or a related field and two years of relevant laboratory experience, or a PhD degree in one of these fields. A Bachelor's degree in one of the above fields, together with a minimum of four years of relevant laboratory experience, would also qualify. Excellent interpersonal and communication skills required. Must be computer literate. Advanced computer skills are preferred. We offer competitive compensation packages; medical, vision, dental and life insurance, tuition assistance, training and staff development, generous paid time off, employer contribution retirement plan and work/life benefits. Apply online at <http://careers.chop.edu> or fax your resume to 215-590-4644. Reference ID 50. Principals only. [EOE]

**Attention Research Professionals:** Come attend The Children's Hospital of Philadelphia Open House, being held on Tuesday, May 21, 2002 from 11:00 am-4:00 pm at the Abramson Research Center, 34th & Civic Center Blvd., Philadelphia, PA. We are especially seeking Research Technicians, Clinical Research Assistants, Postdoctoral Fellows, Biostatisticians and Genetics Counselors. Whether you are a new graduate or a seasoned professional, you owe it to yourself to attend this event. Areas of hire include: Hematology, Neurology, Cardiology, Immunology, Oncology, Endocrinology, Genetics, Nutrition, Biostatistics. As a leader in the advancement of bench

and clinical research, a career at The Children's Hospital of Philadelphia is filled with extensive training and development. We seek candidates who embrace challenges in both basic and clinical investigation, professionals who thrive on discovering unique ways to advance science, develop safer drugs and devices, and contribute to the treatment and healing of children. If you're unable to attend our Open House, apply online at <http://careers.chop.edu> or fax your resume to us at 215-590.4644. Use reference ID 52 in your correspondence. [EOE]

**Senior Scientist:** Global Safety Assessment, Mereside, Alderley Park, Cheshire, is seeking a Senior Scientist in Safety Pharmacology in Cardiovascular Pharmacology. The role of our UK Safety Pharmacology Department, based at Alderley Park, Cheshire is to evaluate undesirable pharmacological effects of new active substances (NASs) and chemical series, in order to predict clinical side effects. We are looking for enthusiastic, flexible individuals with PhDs in pharmacology or related disciplines to work effectively and innovate as part of our expanding team. Experience of working in the pharmaceutical or CRO industry and knowledge of GLP would be an advantage; however, training will be provided. We're now looking for a Senior Scientist to design, conduct, interpret and communicate the effects of new chemical entities (NCEs) on cardiovascular function. To succeed, you'll need experience in a wide range of *in vivo* and *in vitro* models, species and surgical techniques. Key skill capabilities: flexibility, enthusiasm, organisational skills, eye for detail, concern for high standards for results and reports. Key accountabilities/responsibilities: to work within the team to design, conduct and report cardiovascular studies, to contribute to the development of new models within the department, to present data both within and external to the department. Academic/Professional Qualifications: to be considered, you must hold a postdoctoral experience in cardiovascular pharmacology or a related discipline along with a

track record of relevant publications. Experience required: experience of working in a Safety Pharmacology environment in the pharmaceutical or CRO industry would be an advantage. For an application, please Email your name, address, and reference APS/A4189 to [astrazeneca@parkhr.com](mailto:astrazeneca@parkhr.com). Alternatively call 0870-243-6016 between 9:00 am and 5:30 p.m. Monday to Friday. Closing date: **May 9, 2002**. We offer a highly competitive and flexible rewards package. For further information about our organisation visit our website at <http://www.astrazeneca.com>.

### **Postdoctoral Senior Scientist:**

Global Safety Assessment, Mereside, Alderley Park, is seeking a Postdoctoral Senior Scientist. Contract of employment will be via a Local Agency. The role of our UK Safety Pharmacology Department, based at Alderley Park, Cheshire, is to evaluate undesirable pharmacological effects of new active substances (NASs) and chemical series in order to predict clinical side effects. We are looking for enthusiastic, flexible individuals with PhDs in pharmacology or related disciplines to work effectively and innovate as part of our expanding team. Experience of working in the pharmaceutical or CRO industry and knowledge of GLP would be an advantage; however, training will be provided. We are looking for a postdoctoral scientist to join us on a two-year placement, which may involve training in an academic research department and short periods at AstraZeneca sites in Sweden and the USA. The project's purpose is to establish and simultaneously assess the cardiovascular, respiratory and CNS side effects of drugs in rodents. Ideally, you have significant practical knowledge of cardiovascular telemetry techniques in rodents, and an interest in behavioural and respiratory pharmacology. If you have achieved expertise in a broad range of in vivo technical skills in any of these research areas, you will also be considered. In order to collaborate effectively with colleagues, it's essential that you're a self-motivated and team-focused communicator who is eager to

learn new techniques and initiate publication of generated data. Key skill capabilities include basic surgical skills in rodents, experience with working with conscious rodents, working knowledge of behavioural techniques, telemetry, and/or plethysmography in rodent an advantage, basic surgical skills in rodents, experience with working with conscious rodents, interest in integrative (i.e. systems) physiology and pharmacology, concern for standards and regulations, eye for detail, inquisitive mind, calmness under pressure in lab, proactive, flexibility, innovation, forward planning. Key Accountabilities/responsibilities are to contribute to the development of new models within the department, to present data both within and external to the department. Academic/Professional Qualifications: PhD. This position offers a competitive salary. To apply, please email your CV quoting reference to [UKAPHRDiscovery@astrazeneca.com](mailto:UKAPHRDiscovery@astrazeneca.com). Closing date: **May 9, 2002**.

### **Senior Scientist/Team Leader:**

Global Safety Assessment, Mereside, Alderley Park, Cheshire has a Senior Scientist/Team Leader position open in Safety Pharmacology in Respiratory Pharmacology. The role of our UK Safety Pharmacology Department is to evaluate undesirable pharmacological effects of new active substances (NASs) and chemical series, in order to predict clinical side effects. We are looking for enthusiastic, flexible individuals with PhDs in pharmacology or related disciplines to work effectively and innovate as part of our expanding team. We're now looking for a Senior Scientist/Team Leader to design, conduct interpret and communicate the effects of NASs on respiratory function using relevant experimental in vivo and in vitro models. Key skill capabilities include flexibility, enthusiasm organizational skills, eye for detail, and a concern for high standards for results and reports. Key accountabilities/responsibilities are to work within the department of safety pharmacology to design, conduct and report respiratory studies, to contribute to the implementation of new models within

the department, and to present data both within and external to the department. Academic/Professional Qualifications include postdoctoral experience in respiratory pharmacology or a related discipline, along with a track record of relevant publications. Experience of working in a Safety Pharmacology environment in the pharmaceutical or CRO industry would be an advantage; knowledge of GLP would also be a plus; however, training will be provided. For an application please Email your name, address, and quote reference APS/B4189 to [astrazeneca@parkhr.com](mailto:astrazeneca@parkhr.com). Alternatively call 0870-243-6016 between 9:00 am and 5:30 pm Monday to Friday. Closing date: **May 9, 2002**. This position offers a highly competitive and flexible rewards package. For further information about our organisation visit our website at <http://www.astrazeneca.com>.

## Faculty Positions

**Faculty Positions:** Positions are open for Assistant Professors of Physiology within the Department of Environmental Health Sciences at Johns Hopkins University. These unique positions provide many opportunities for independent and collaborative research at the center of one of the world's premier academic research institutions. We are seeking faculty to undertake innovative research aimed at elucidating mechanisms underlying how the environment causes or alters the pathophysiology of lung or cardiovascular disease. Interested applicants should forward a current CV with a letter of interest to Dr. Wayne Mitzner; Email: [wmitzner@jhsph.edu](mailto:wmitzner@jhsph.edu); Tel: 410-614-5446. Johns Hopkins is an equal opportunity/affirmative action employer.

**Faculty Positions:** Chapman University is seeking applications for two faculty positions in the Department of Physical Therapy, including an endowed chair, effective August 2002. Requirements for the endowed chair include relevant PhD with expertise in physiology, exercise physiology, and/or

cardiopulmonary (vascular) research. We are seeking persons with a distinguished record of research and publication, including a history of extramural funding. Requirements for the other position include relevant PhD with expertise in one or more of the following areas: neurophysiology, administration, pharmacology, physiology, anatomy, or radiology. In addition, we are seeking someone with a distinguished record of research, publication, and extramural funding. Successful applicants will have demonstrated excellence in teaching and commitment to cultural diversity. Submit cover letter, vitae, evidence of qualifications, list of five references with addresses, telephone numbers and email addresses to: Prof. Lynn Tierney, Search Committee Chair, Department of Physical Therapy, Chapman University, Orange, CA 92866 or [ltierney@chapman.edu](mailto:ltierney@chapman.edu). Application review begins immediately and continues until the position is filled. Chapman University is committed to providing equal career opportunities to all individuals.

**Assistant Professor:** The Department of Biological Sciences, Simon Fraser University, British Columbia, is seeking a tenure track faculty member in the area of Cell Biology. The appointment will be made at the Assistant Professor level with a start date on or after January 1, 2003. Any area of modern Cell Biology is of interest, but preference will be given to candidates who study functional aspects in cellular systems that bridge our current research strength at the subcellular and the organ and tissue levels (<http://www.sfu.ca/biology/>). The successful candidate will pursue a vigorous, externally funded research program that includes the training of graduate students. She or he also will be expected to develop upper division undergraduate and graduate courses in cell biology, and contribute to the teaching of the introductory course in Cell Biology. Review of applications will begin on **September 3, 2002**, and the search will remain active until the position is filled. Applicants should send a Curriculum Vitae, three repre-

sentative reprints, a one-page summary of their research objectives, and three letters of reference to: Dr. Norbert H. Haunerland, Chair, Department of Biological Sciences, Simon Fraser University, 8888 University Blvd., Burnaby, B.C. V5A 1S6, Canada; Fax: 604-291-4312. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. The appointment is subject to final budgetary approval by the University. Simon Fraser University, located in the greater Vancouver area, is committed to employment equity, welcomes diversity in the workplace, and encourages applications from all qualified individuals including women, members of visible minorities, aboriginal persons, and persons with disabilities.

**Assistant Professor:** The University of California at San Diego (UCSD) is looking for a PhD or MD/PhD, preferably who has completed a postdoctoral fellowship, with expertise in membrane transport [including relevant methodologies (e.g., Ussing chamber, patch clamp, etc.), receptor biology, and extracellular, as well as intracellular transport events] interested in rewarding assistant professor or staff position in an established laboratory at UCSD. Available June 1, 2002. Send CV including a list of three references to: Jon Isenberg, UCSD GI Division, 200 W. Arbor Drive, San Diego, CA 92103-8413; phone: 619-543-2675.

## Postdoctoral Positions

**Postdoctoral Position:** Applications are invited for a NIH-funded postdoctoral position to study the effects of age on central neural regulation of sympathetic nerve discharge (in vivo experiments). Applicants should have a PhD and/or MD and one to two years relevant experience in cardiovascular physiology or neurophysiology. Experience in autonomic neurophysiology is desired. Opportunity will be available to interact with other members of the investigative team involved in immunological and neuroanatomical

studies. The position is available immediately. For consideration send curriculum vitae, brief statement of research interests, and the names and addresses of three references to: Dr. Michael Kenney, Anatomy and Physiology Department, Kansas State University, 228 Coles Hall, Manhattan, KS 66506-5802. Email applications are encouraged: [kenny@vet.ksu.edu](mailto:kenny@vet.ksu.edu). Kansas State University is an Equal Opportunity Employer. Kansas State University actively seeks diversity among its employees.

**Postdoctoral Fellow:** Positions are available in the Genomics and Cancer Research programs in the JLC-Biomedical/Biotechnology Research Institute at North Carolina Central University. Areas of investigation include SNP and microsatellite marker analysis in genomic DNA from different ethnic groups. Interested individuals should possess a PhD and/or MD, and submit curriculum vitae, description of research interests and career goals, and three letters of reference to Pradeep Chatterjee, PhD, Biomedical/Biotechnology Research Institute, North Carolina Central University, 700 George Street, Durham, NC 27707. North Carolina Central University is a constituent institution of the University of North Carolina system and an Equal Opportunity/Affirmative Action Employer. NCCU complies with the Immigration Reform and Control Act of 1986.

**Postdoctoral Fellow:** Applications are invited for a NHLBI funded two or three-year postdoctoral appointment which commences immediately. In conjunction with the UAB Center for Free Radical Biology these multidisciplinary studies will provide mechanistic insight into the role of nitric oxide signaling in the pathoetiology of cardiovascular dysfunction; including atherosclerosis, diabetes, and myocardial ischemia. Ultimately, it is hoped that these studies will guide development of pharmacological interventions to limit the detrimental effects of oxidants and thereby decrease the mor-



idity and mortality associated with chronic ethanol consumption. These studies are approached from a biochemical, physiological, pharmacological and cell biology perspective. A competitive salary will be offered with ample opportunity for attendance at national meetings in a rich and supportive research environment. Candidates will have access to state of the art technology in proteomics, molecular biology and mass spectrometry. Collaboration and interaction with members of the Center for Free Radical Biology is encouraged in addition to training in grantsmanship and career development. Applicants should hold a PhD and/or MD degree, and have strong background in cardiovascular physiology with some experience in HPLC, molecular biology, signal transduction, cell culture or protein chemistry. Individuals should submit a cover letter indicating their area of interest and a summary of research training, curriculum vitae and three references to: Dale A. Parks, PhD, Dept. of Anesthesiology, BMR2-324, University of Alabama at Birmingham, 1530 3rd Ave South, Birmingham, AL 35294-2172 or email: dale.parks@ccc.uab.edu.

**Postdoctoral Fellowship in Hawaii:** A postdoctoral fellowship is open at the University of Hawaii from September 2002, for two years, to study cellular mechanisms of stimulus-secretion coupling in peptidergic secretory cells (<http://www.pbrc.hawaii.edu/ian/>). Applicants should have experience in at least one of the following: patch clamping with capacitance measurements, fluorescence microspectroscopy (e.g. fura), or amperometry. The current project examines the role of electrical activity and  $Ca^{2+}$  movements in control of the secretion of the osmoregulatory hormone, prolactin, from dissociated tilapia pituitary cells. In this fish, prolactin cells are segregated in the pituitary and hence easily isolated. The rate of prolactin secretion is responsive to medium osmolarity. Fax or mail (no email applications, please) a statement of career goals, resumé, names and email or phone contacts for three

references to Ian Cooke, Békésy Laboratory of Neurobiology, 1993 East-West Road, Honolulu, HI 96822; fax: 808-956-6984.

**Postdoctoral Position:** The Children's Hospital of Philadelphia (CHOP) currently has a postdoctoral position available to study the molecular mechanisms underlying the link between growth factor signaling, cell division and T cell differentiation. These studies will be done in experimental murine models of T cell function including organ transplantation and intracellular microbe infection. CHOP and the University of Pennsylvania campus support a tremendous immunology and biology research community. Salary is very competitive and includes an excellent benefits package. Applicants should have a PhD or an MD and practical knowledge and experience in molecular biology, signal transduction and/or cellular immunology. Please submit a CV, a statement of research interests, and the names and contact information for three references to Dr. Andrew Wells, The Children's Hospital of Philadelphia, 802 Abramson Research Center, 3516 Civic Center Boulevard, Philadelphia, PA 19104; email: adwells@mail.med.upenn.edu. [EOE]

**Postdoctoral Position:** Yale University School of Medicine, Section of Cardiovascular Medicine, has a postdoctoral position available, effective immediately, in molecular imaging program. Position in multidisciplinary laboratory focused on targeted imaging of myocardial angiogenesis, coronary physiology, and myocardial mechanics. Laboratory employs small and large animal models of ischemia/reperfusion to develop non-invasive imaging approaches for assessment of myocardial angiogenesis. NIH-funded projects involve cardiovascular imaging of large and small animals with multiple modalities, including 3D echocardiography, single photon emission computed tomography (SPECT), angiography, and magnetic resonance imaging. Applicant should hold PhD and/or MD degree, and have strong background in

cardiovascular physiology with some experience in immunohistochemistry, animal surgery, or imaging. Please send a statement of research interests, curriculum vitae, and three letters of reference to Albert J. Sinusas, MD, Director of Animal Research Laboratories, Section of Cardiovascular Medicine, Yale University School of Medicine, P.O. Box 208017, New Haven, CT 06520-8017; email: albert.sinusas@yale.edu.

**Postdoctoral Fellowship:** An NIH-funded postdoctoral fellowship is available in the Division of Nephrology at the University of Utah Health Sciences Center. Research involves development and analysis of mice with conditional targeting in the kidney using cell- and temporally-regulated strategies in order to examine the physiologic and pathophysiologic relevance of renal endothelin and polycystin. Techniques involve construct development, generation of transgenic and knockout mice, analysis of phenotype using PCR, RT-PCR, in situ hybridization, immunohistology, metabolic cage balance studies, blood pressure (direct and indirect) determination, ELISA's, and other general molecular, cell and physiologic techniques. Applicants should hold a PhD and/or MD. Some laboratory experience is required. Submit Curriculum Vitae, brief statement of research interests and the name and address of three references to: Donald E. Kohan, MD, PhD, Professor of Medicine, Division of Nephrology, University of Utah Health Sciences Center, 30 No 1900 East, Salt Lake City, UT 84132-2412. Phone: 801-581-2726, fax: 801-581-4343, Email: donald.kohan@hsc.utah.edu. Email applications are encouraged. [AA/EOE]

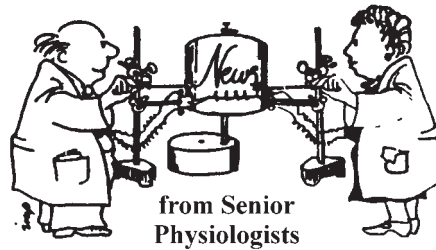
## Letter to Karlman Wasserman

**Adelbert Ames** writes: "Thank you for your letter of some months ago, which only now resurfaced on my desk. I very much doubt if my recent activities could pass peer review for publication in *The Physiologist*. Though I follow with amazement from here in the foothills of Vermont the accelerating progress in our understanding of how living things work, more of my attention has been devoted to a chain saw and a cutterbar behind the tractor. As a consequence, I've seen little of fellow physiologists, though I have recently read quite a lot of their works in the course of writing a review (published last winter) on the energy requirements of brain function. I would be delighted to discuss such problems (and anything else) with any physiologists who might be passing by."

## Letter to G. Edgar Folk

**Peter Macklem** writes: "I apologize for taking so long to answer your kind letter of October 15. I am enjoying pseudo-retirement by spending my winters in Italy working with a group of outstanding bioengineers from the Politecnico di Milano. They, Andrea Aliverti, Raffaele Dellaca and Antonio Pedotti have developed a new technology called optoelectronic plethysmography. With this system a large number of reflective markers are placed over the surface of the chest wall. Each is tracked continuously in 3D by videocameras and a parallel processing computer reconstructs the chest wall and any of its compartments one cares to analyze. It's the answer, not to a maiden's dream perhaps, but to those of us who dream about measuring breathing when it's difficult to do so, it's an equivalent. Using the system it's possible to measure all the parameters of ventilation, including changes in absolute lung volume, on a breath-by-breath basis, without either mouth piece or noseclip. It can be used during phonation, wind instrument playing, while sleeping, as a monitoring device in the ICU, in infants at risk for SIDS and so forth.

"It is pure coincidence that my wife, Joy and I head to Italy when the Canadian winter becomes unbearable and that we return home at wildflower



er time. We now live on the shore of the St. Lawrence River in the 1,000 Islands. Of course, I never sacrifice the time I need to analyze the experiments performed in Italy in order to sail, swim, or go cruising.

"Like many other physiologists, I am dismayed that biologists these days seem to think that how molecules and cells behave is somehow more important than how humans function; that academic promotions are often based on the impact factors of the journals one publishes in; that the papers published in journals with the highest impact factors are usually chosen by investigators who believe that the science of molecules is more important than the science of whole animals; that this creates a feed-forward mechanism whereby cell and molecular biologists get promoted to positions of power and prestige where they can ensure that papers in cell and molecular biology continue to predominate in journals with the highest impact factors; that this guarantees perpetual pre-eminence of reductionist science at the expense of integrative biology.

"I do not wish to denigrate in any way the stunning successes of cell and molecular biology, but we should have a better balance. Perhaps it's a good time to be pseudo-retired."

## Letters to Felix Bronner

**Edward Freis** writes: "Thank you and thank the American Physiological Society for remembering my 90th birthday. I am in reasonably good health and still interested in the physiology of the circulation. I have recently published a review of some of my studies in the journal *Hypertension*, 2001, 118, 1-5.

"I suspect that my longevity can be attributed to good genes and also to a

low saturated fat diet and maintenance of my blood pressure at about 120/80 mm Hg. I have three wonderful children and a dear friend who keep in constant touch and take turns in taking me out to dinner. I have six grandchildren and six great-grandchildren who are my pride and joy."

**Martin Gold** writes: "Thank you for your letter. Time creeps along and suddenly 70 years have passed into history.

"I became 12 in July 1944 and in August caught poliomyelitis. After five years in three hospitals and five orthopedic operations, I came home, a quadriplegic with crutches, leg braces and a wheelchair.

"Still, I graduated with a BS in chemistry from The Philadelphia College of Pharmacy and Science at 22. Then I attended Hahnemann Medical College, receiving my MS and PhD, working on enzyme properties under Peter Oesper.

"I stayed on for eight years in the Department of Physiology, with John Spitzer, studying fatty acid metabolism. Then I moved to the Philadelphia Geriatric Center, researching the difference in brain metabolism in young and old rats after behavioral training.

"My physiology training stood me in good stead as I became director of clinical chemistry at Nazareth Hospital. I published papers on drug metabolism in patients who overdosed their medications. I moved to Mercer Medical Center (Trenton, NJ) as Director of the Clinical Chemistry Laboratory, and finally as Quality Assurance Coordinator for the Department of Laboratory Medicine.

"My working days closed prematurely due to post-polio syndrome and I retired in 1995. My muscles have continued to weaken and I do not get out much. I never married, and have full-time help for daily living. I fill my time reading scientific literature and science fiction, which I enjoy.

"Looking back on my career, I am pleased with what I was able to accomplish under difficult circumstances, and I am grateful to all the wonderful people who helped me do it."

## Letter to Novera Herbert Spector

**James Scheuer** writes: "I am replying to your letter related to the fact that I was born in 1931 and requesting information about my current activities.

"From 1987 through 1999, I chaired the Department of Medicine at Albert Einstein College of Medicine and Montefiore Medical Center. I voluntarily stepped down from that position and took a six-month sabbatical at the National Heart and Lung Institute in London, England in order to update some of my physiologic skills. There I worked with Dr. Sian Harding who is an expert in isolated cardiomyocyte physiology and pharmacology. On returning to Albert Einstein College of Medicine, I set up a similar laboratory facility so as to be able to study contractile activity and calcium cycling in isolated myocytes. We are exploring these relationships in various transgenic models. Getting back into the laboratory and dealing with younger and more modern scientists after a long stint as an administrator and educator is an exciting way to end one's career.

"My words of wisdom for younger researchers are to focus on investigation. A career in biomedical inquiry has never been more exciting nor more promising. Administration and education also have great rewards, but if you are trained as a scientist, nothing is more stimulating."

## Letters to Michael Barany

**Robert Doty** writes: "The arrival of the elegant memento from President Hall attesting to my 50th year as a member of the American Physiological Society has vigorously reminded me of my long languishing promise to you to write a few words in my new role as a 'Senior Physiologist.' Your greetings last year for my 80th Birthday, and invitation to write, arrived just as I was finishing a grant application, and leaving for three weeks in China. Thankfully, the latter was far more successful than the application. Yunnan is fascinating, both for its great diversity of indigenous peoples and its spectacular scenery. There was also a visit to the Woolong Panda

Research Center, where I learned of the strange gastrointestinal and other physiology of this poor carnivore living on an herbivorous diet. I made great use of my digital camera, with some 500 (!) pictures; so much easier to manipulate with software than with chemistry.

"Some research doings have been successful. Study Sections in their general wisdom took me out of the split-brain macaque business, so that I no longer have to face long hours of exacting surgery, or the other rigors of training these clever animals, so well-endowed with visual memory not too different from our own. So, we now work with the ultimate primate, and have just submitted a paper using fMRI to study hemispheric differences in frontal lobe activity for remembering words versus nonverbalizable images. The lab has several other human experiments going, examining the time it takes to transfer attention from one to the other cerebral hemisphere.

"My main activity, however, has been in writing a joint, 'on-line' autobiography with my now departed wife. This arose when I was called upon to write a scientific autobiography for volume 3 of the *Society for Neuroscience* series. In doing so my attention was drawn to the nearly daily letters my beloved and I had exchanged during the four years that I was in the army; and in addition she kept a daily diary throughout her life. For the first 10 years of our marriage I have transcribed, using speech recognition software, 1.25 million words, and have now edited it down to 280,000 words, 2 volumes if I ever get it published. It is a uniquely veridical record of intense romance, travelogue, war, philosophy, poetry, and our occasional but bitter quarrels. I am becoming a sociologist as well as physiologist! But of course I am also driven by a deep nostalgia for the incomparably beautiful 58 years we spent together, a success whose roots and workings are so vividly depicted in our words as we lived it. I mourn her deeply, yet at the same time I am so blessedly aware of having with her experienced a life supreme in all fulfillment."

**Mary E. Carsten** writes: "Thank you for your birthday wishes and your inquiry about my activities and words of wisdom. I have always thought that the best thing to do is to continue what you have been doing or at least to continue with your routine as much as possible.

"I am still going to UCLA every day. While I do not have a laboratory anymore to explore Ca<sup>2+</sup> transport in smooth muscle sarcoplasmic reticulum, I still have a small office with computer literature and attend lectures. Thus, I edited a book on smooth muscle and wrote the chapter on the endocrinology of pregnancy and parturition for our textbook for medical students and presently revising it.

"Outside interests have also been calling. Thus, I go swimming almost every day. This is not only because I like it but also to keep me healthy. The university has an Olympic size outdoor swimming pool and every morning one meets interesting people there, most of them in similar situations as myself.

"Since my retirement I have been traveling a lot. One of my wishes came true: a safari to Africa (Kenya). Other than that my preferred countries were France and Scotland, with repeated trips to both. And I have kept up my interest in collecting art objects and have made frequent visits to museums, art galleries and exhibits.

"As to words of wisdom to young scientists: Through all trials and tribulations, setbacks, long working hours, never give up. Be the best you can be."

**Bella T. Altura** writes: "It was a surprise and honor indeed to have received your kind letter of January 11, on behalf of my recent birthday, and I thank you for your kind compliments of my research contributions.

I enjoy reading news from senior scientists, but never expected to be called upon to participate. So here goes: it has been great fun and a joy for me to be able to contribute to science in general, and physiology in particular, throughout the years, without having to have the repetitive and rather nerve-racking chore of writing a research grant, as that job was

usually done by my beloved husband. He has let me tinker in the lab to my heart's content, has let me write those papers which I wanted to write, has let me "correct" his writings and interact, criticize or applaud his thoughts, and patiently listened to my ideas, when they were worthwhile. He has been a great teacher to me in that he let me make my own mistakes and heart my frustrations through complaints, when things did not work out as expected. In addition, I have to say, that I have been lucky in our department as I was asked to teach only that which I felt comfortable in teaching and was not stuffed in committees I did not wish to attend, (perhaps out of fear by the powers that be, to have to listen to Burt's protests), but nevertheless, the result was to my satisfaction!

"At this time I have semi-retired so that I can still work in the lab to follow my scientific interests, but have time to smell the roses, read and write, and occasionally play with our two-year old granddaughter, the wonder of our life.

"To young lady scientists I would say be careful in choosing a mate; it is not so important how many prizes you win, but how successful you are, in every day life, to be able to do that which you wish to do."

**Valentin Popa** writes: "Thank you very much for your kind letter of congratulation on my 70th birthday.

"At age 70, I am active and happy with my life. I am now in private practice (internal medicine, allergy and pulmonary) but the impetus is not financial: I have fun with the riddles of medicine and draw immense satisfaction from helping a suffering man. I am not doing that as relaxed, intermittent academic rounds, but as busy, daily clinical work. I work harder than

in my residency years, juggling office and hospital practice plus two on-call schedules. For instance, I am on duty one workday a week and two to three weekends a month. In one of the four hospitals that I cover, I may consult on or admit an average of 15 patients per weekend.

"This is not all. Some of the fun comes from my research in the clinical aspects of the immunoglobulin deficiency. This is totally different from my previous field of interest, the immunopharmacology of the airways. For me, it is rewarding and also amusing that part of my best research came after age 60 and in a field that I had not explored before. It is about IgG subclass deficiency in adults and the role of immunoglobulins in interstitial lung diseases. This clinical research involves articles, presentations, editorials and seminars at national meetings.

"Unfortunately, the pleasure of being active at age 70 is spoiled by the current HMO-driven medical practice. To understand why I write about it in this letter, think about the Cato the Elder who used to bring up the destruction of Carthage regardless of the topic of his speech ('et Carthaginam delendam esse'). In Sacramento, the capital city of HMO/independent practice association (IPA), the practice tends to be frustrating, almost depressing. The public feels that 'gate-keeping' keeps him out of good quality medicine. The practicing physician suffers from the convoluted formalities involved in health care and the progressive deterioration of collegial atmosphere; the latter is unavoidable when the competition is for contracts rather than quality of care. Also, if the previous clinical mentors pounded on the individuality of the patient and advised us

to use medical judgment, the 'leaders' of HMO/IPA emphasize the uniformity of each disease and preach an uniform approach (pathways) for the 'lives' entrusted to them. For these and other reasons, it is not surprising that physicians tend to emigrate from rather than immigrate to California. As a practicing physician but also a current and former teacher, my frustration as a practitioner gains an added academic dimension. I am bewildered that in certain training programs in primary care, the accent is not on original thinking and referenced opinions—which develop competent physicians—but teaching will inevitably develop generic, scientifically de-personalized physicians aiming to care for generic patients.

"Luckily, life is more than a profession. As many others, I have a hobby, music, and I go to church. I am a happy father and a happy husband. My daughter is an editor in San Francisco and got married last year. My wife is active (distinguished librarian) and has just finished writing a book. I like to travel and I intend to do so for as long as I can. It is a spiritual and humbling experience to listen in Wuhan, China to the bells used to make music around 400 AC with a seven-note scale. Or in Burma, to see how men of any age could go in a Buddhist monastery, meditate and learn for weeks, months or years and then return to their usual life. Or to watch the Burning Bush in St. Catherine's Monastery in the Sinai. Drawing humility from travel may infuse wisdom in our daily life and prepare us for the Long Voyage.

"I wish you success in your endeavors and great health to enjoy them!" ❖

## Moving?

If you have moved or changed your phone, fax, or email address, please notify the APS Membership Office at 301-530-7171 or fax to 301-571-8313. Your membership information

can also be changed by visiting the Members Only portion of the APS website at <http://www.the-aps.org>.

## The Autonomic Nervous System in Health and Disease

David S. Goldstein  
Marcel Decker, Inc., New York, 2001

The volume written by Dr. David Goldstein represents an ambitious review of the literature concerning the function of the varied components of the autonomic nervous system in health and disease states. It provides a reasonable overview of autonomic neuronal control of the internal milieu, focusing in particular on how the internal nervous system remodels in the presence of specific pathologies.

The author introduces his volume with a short, but excellent summary of the major contributors to our understanding of the anatomy and function of the autonomic nervous system. Major 'milestones' in the evolution of current understanding of this nervous system are presented in a succinct and logical fashion. The author pays particular attention to the concepts developed by Bernard, Oliver, and Schaefer, Langley as well as Cannon and von Euler. The author also emphasizes the importance of Neurocardiology for the field of integrative medicine, something that is timely.

This is followed by a discussion of the various components of the autonomic nervous system (chapter 2). A good overview of catecholamine release and re-uptake mechanisms at sympathetic efferent nerve terminals is provided, along with data about adrenergic receptor subtypes. The author also provides brief descriptions of the role of epinephrine release from the adrenal glands, as well as non-cholinergic, non-adrenergic neurotransmission, along with dopaminergic mechanisms, are presented.

Chapter 3 is devoted to the role that central autonomic neurons play in maintaining adequate internal organ function. The complex neuroanatomy of central autonomic neurons is treated in a rather superficial manner, which may be appropriate given the presumed general audience of such a volume. The author categorizes central autonomic interneuronal interac-

tions, the concept of pacemaker neurons regulating sympathetic efferent neuronal outflow via "coupled oscillators" is presented to explain sympathetic efferent preganglionic neuronal rhythmic activity (page 139). The outflow of parasympathetic efferent preganglionic neurons is treated in an equally cursory fashion (c.f., page 182-183). The complex integration that occurs among neurons within the spinal column is simplified beyond reason. On the other hand, the author does a credible job discussing interactions among autonomic neurons in the medulla, pons, midbrain and hypothalamus.

With this background information, the author then proceeds to discuss how the organism copes with stress (chapter 4). The "central command" thesis that purportedly "regulates sympathetically-mediated vasoconstrictor tone" (page 226) is discussed. The complex interneuronal interactions that occur within the central neuronal components of the ANS are barely touched upon. The author presents the concept that "arteriosclerotic cardiovascular walls splint baroreceptors" to prevent (not modify) sympathetic efferent reflex activation, surely a simplistic approach to the complex field of altered cardiovascular control. The author also states that angiotensin II exerts little direct effect on the heart. He states that, if anything, angiotensin II causes bradycardia despite recent experimental evidence indicates that angiotensin modifies populations of intrinsic cardiac neurons to induce cardioaugmentor effects.

In chapter 5, autonomic neuronal responses to stressors are presented in a very conventional manner. Concepts presented in this chapter may generate debate. For instance, the author states that BOTH efferent limbs of the autonomic nervous system are activated after adrenal medullar function. That the sympathetic efferent neurons function in exclusion of "housekeeping system" while the adrenal gland functions as a "distress system" is a concept without scientific foundation. Epinephrine does exert significant effects on total vascular resistance,

but not by decreasing arteriolar resistance (page 303).

In the chapter entitled Clinical Evaluation (chapter 6), a reasoned attempt is made to depict alterations in autonomic neuronal control in the format of the history, physical examination and scientific analysis of monitored indices. It is unfortunate that the entire GI system is dealt with in a cursory fashion (in tow lines at the onset of this chapter and briefly on pages 355-356) since the importance of the ANS to its function is enormous. With respect to cardiovascular reflexes, the author places too much emphasis on unreliable responses elicited by the Valsalva maneuver. Power spectral analysis, another limited concept when applied to neuronal control of heart rate, is presented in a clear, but wholly uncritical manner. The author also presents the thesis that "high pressure baroreceptors (mechanosensory neurons associated with major arteries) only regulate mean arterial pressure (blood flow to the brain) while low-pressure baroreflex" (mechanosensory neurons associated with vessels with low pressure presumably) regulate "central venous pressure, cardiac output and filling and extracellular fluid volume"? This represents another example of misinformation presented in this text.

The technique of sympathetic microneurography, the presumed quantification of activity generated by sympathetic efferent postganglionic axons in a particular peripheral (assessable) nerve, is also dealt with in a superficial manner. So are other tests currently employed to study altered ANS status, such as lower body negative pressure. Recent research delineating ventricular interstitial catecholamine content puts much of the literature concerning the quantification of catecholamine AV differences "across the heart" into doubt. The author imaging techniques are presented as though they are sensitive enough to detect alterations in, for instance, the activity generated by sympathetic efferent postganglionic neurons innervating a particular organ.

The next three chapters deal with

autonomic failure, essential hypertension and cardiac necrosis, among other topics. Varied and sometimes fanciful conclusions are presented when discussing the role of the ANS in such pathologies. For instance, the author states that coronary artery occlusion does not lead to ventricular fibrillation if psychological stress is minimized (page 427). If the mass of ventricular tissue involved in an infarct is large enough, psychological status of the patient will likely not be a primary determinant of infarct size or any associated ventricular electrical instability. A transmural ventricular infarction does not modify the capacity of axons traversing the infarct to influence regional mechanics (i.e., it does not cause regional denervation).

Chapter 8 ("Disorders in which abnormal catecholaminergic function is etiologic") presents data in a more reasoned fashion. The author summa-

rizes autonomic failure in the absence or presence of central neuronal degeneration. The author compares autonomic degeneration in disease states such as Parkinson's disease and Shy-Drager syndrome with clarity, pointing out that central as well as peripheral autonomic neurons can be involved. The effects of significant emotional distress and the resultant excessive activation of sympathetic efferent neurons on selective target organs (specifically the heart: page 490-1) are presented clearly. This is followed (chapter 9) by an excellent overview of the limited amount of data concerning ANS function in neurasthenia, chronic fatigue syndrome, fibromyalgia, post-traumatic stress disorder and essential hypertension. The author is very successful in presenting information about "coronary prone" behavior and job stress as related to autonomic dysfunction. The

final chapter presents the authors concepts about the importance of "integrative medicine," a term used to denote a return to thinking in integrative terms when assessing internal organ diseases. Comparisons between "reductionism" (linear logic) versus "homeostasis" thinking are somewhat overdrawn as surely both approaches are required in order to understand syndromes like heart failure from an autonomic nervous system perspective.

In sum, this volume presents a plethora of data concerning peripheral and central autonomic neuronal function in normal and specific pathologies. After reading this volume, one might consult more specialized texts in order to gain an adequate understanding of autonomic neuronal regulation of specific organs in normal and pathological states. ❖

## Books Received

*Endurance Exercise and Adipose Tissue.*

Barbara Nicklas (Editor).

CRC Series in Exercise Physiology.

Boca Raton, FL: CRC, 2001, 176 pp., illus., index, \$89.95.

ISBN: 0-8493-0460-1.

*Proteinase and Peptidase Inhibition: Recent Potential Targets for Drug Development.*

H. John Smith and Claire Simons (Editors).

New York: Taylor & Francis, 2002, 420 pp., illus., index, \$95.00.

ISBN: 0-415-27349-8.

*The Somatosensory System: Deciphering the Brain's Own Body Image.*

Randall J. Nelson (Editor).

Methods & New Frontiers in Neuroscience.

Boca Raton, FL: CRC, 2001, 399 pp., illus., index, \$119.95.

ISBN: 0-8493-2336-3.

## Gift Planning Opportunities

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

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

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

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

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

**Designated Gifts:** Gifts given to

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

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

For more information on gift giving to the APS, please contact Martin Frank, Executive Director (Tel.: 301-530-7118, Email: mfrank@the-aps.org), or Robert Price, Director of Finance (Tel.: 301-530-7173, Email: rprice@the-aps.org).

## APS Members Elected to the Academy of Arts and Sciences

The American Academy of Arts and Sciences announced the election of 117 new fellows and 30 foreign honorary members for 2002. The fellows and honorary members are being recognized for "preeminent contributions to all scholarly fields and professions," Patricia Meyer Spacks, the organization's president, said in a statement. Among those elected are four APS

members, **John A. Clements**, **Apostolos P. Georgopoulos**, **Nicholas C. Spitzer**, and **Michael P. Stryker**.

Clements is a professor in the Cardiovascular Research Institute at the University of California, San Francisco Medical Center.

Georgopoulos is a professor in the Brain Science Center at the

University of Minnesota, Twin Cities.

Spitzer is a professor of biology, at the University of California, San Diego.

Stryker is a professor in the Department of Physiology at the University of California, San Francisco. ❖

## Churchill Elected to NSBRI Board of Directors

Susanne E. Churchill, associate dean for research at Harvard Medical School and APS member, has been elected to the Board of Directors for the National Space Biomedical Research Institute (NSBRI).

"Dr. Churchill's experience with various NASA Life Sciences' groups, the International Space University (ISU) and the research community make her a welcome addition to the board," said

Dr. Bobby R. Alford, NSBRI board chairman and chief executive officer.

Churchill has been a member of a variety of NASA working groups and committees, served as the chairman of the Department of Life Science at the ISU and was the principal investigator on several NASA-funded projects studying the effects of weightlessness on cardiovascular function, including two flight experiments developed for

the Space Shuttle. She is the editor of the textbook *Fundamentals of Space Life Sciences*.

Besides her administrative duties, Churchill is a senior research fellow in the Peabody Society at Harvard and chairs the External Advisory Committee for the Research Centers in Minority Institutions Program at Morehouse School of Medicine. ❖

**Abu-Bakr Al-Mehdi** is currently with the Department of Pharmacology, University of South Alabama, Mobile, AL. Al-Mehdi had been affiliated with the Department of Environmental Medicine and Physiology, University of Pennsylvania, Philadelphia, PA.

**Evangelos T. Angelakos** has accepted the position of Provost, Ross University School of Medicine, Cherry Hill, NJ. Prior to his new post, Angelakos was Director of the Medical Science Track Program, Beaver College, Glenside, PA.

**Kenneth C. Beck** recently joined the Department of Radiology, University of Iowa College of Medicine, Iowa City, IA. Beck previously was affiliated with the Division of Pulmonary Critical Care Medicine, Mayo Clinic and Foundation, Rochester, MN.

**Joseph N. Benoit** has accepted a

position as Dean of the Graduate School, University of North Dakota, Grand Forks, ND. Prior to his new post, Benoit was with the Department of Physiology, University of South Alabama College of Medicine, Mobile, AL.

**Richard D. Bland** has joined the Department of Pediatrics, SUNY, Buffalo, Amherst, NY. Prior to his new position, Bland was with the Department of Pediatrics, University of Utah Medical Center, Salt Lake City, UT.

**Ignatio G. Camarillo** has accepted a position as Assistant Professor, Department of Biology, Ball State University, Muncie, IN. Previously, Camarillo was a Postdoctoral Fellow associated with the Sinsheimer Laboratories, University of California, Santa Cruz, CA.

**Kristin Leigh Campbell** has affiliat-

ed with the Faculty of Physical Education, University of Alberta, Edmonton, Alberta, Canada. Formerly, Campbell was associated with the Allan McGavin Sports Medical Center, University of British Columbia, Vancouver, British Columbia, Canada.

**Sylvain Cardin** joined the Department of Neuroscience and Molecular Biology, Pro-Neuron Inc., Gaithersburg, MD. Cardin had been affiliated with the Department of Molecular Physiology and Biophysics, Vanderbilt University Medical School, Nashville, TN.

**John Anthony Delyani** recently joined Pharmacia, Technology Acquisitions, Peapack, NJ. Prior to his new appointment, Delyani was affiliated with Pharmacia Corporation, Cardiovascular Discovery Research, Skokie, IL.

**Susan DeMesquita** has affiliated with the Department of Physiology,

Ross University School of Medicine, Roseau, West Indies. Prior to her new assignment, DeMesquita was associated with the Department of Physiology, Marshall University School of Medicine, Huntington, WV.

**Christine M. Donmoyer** recently moved to the Institute of Human Nutrition, Columbia University, New York, NY. Formerly, Donmoyer was with the Department of Molecular Physiology and Biophysics, Vanderbilt University, Nashville, TN.

**Mark D. Grabiner** originally was affiliated with the Department of Biomedical Engineering, Biomechanics and Rehabilitation Clinic, Cleveland Clinic Foundation, Cleveland, OH. Grabiner is presently associated with the School of Kinesiology, University of Illinois, Chicago, IL.

**John Joseph Haddad** has affiliated with Anesthesia and Perioperative Care, University of California, San Francisco, CA. Haddad was formerly with the Tayside Institute of Child Health, University of Dundee, Ninewells Hospital and Medical School, Dundee, Scotland.

**Paul M. L. Janssen** joined the department of Physiology and Cell Biology, Ohio State University, Columbus, OH. Previously, Janssen was with the Department of Medicine, Johns Hopkins University, 720 Rutland Avenue, Baltimore, MD.

**Edward J. Johns** has accepted a position with the Department of Physiology, University College Cork, Cork, Ireland. Prior to his new appointment, Johns was affiliated with the Department of Physiology, University of Birmingham Medical School, Birmingham, England.

**Tomio Kanno** moved from the Yannaiharu Institute Inc., Fujinomiya, Japan and accepted a position

with Hokkaido University, Minami-ku, Sapporo, Japan.

**Philip R. Kastner** accepted a position as Associate Director, In Vivo Pharmaceuticals, Department of Research and Development, Alcon Laboratories Inc., Fort Worth, TX. Kastner had been with Drug Regulatory Affairs, Quintiles Inc., Kansas City, MO.

**Stephen James Kinzey** recently joined the Department of Kinesiology, California State University, San Bernardino, CA. Previously, Kinzey had been affiliated with the Department of Exercise Science and Leisure Management, The University of Mississippi, University, MS.

**Shannon T. Knuth** is currently with the Department of Biology and Customer Support, Gene Tools, LLC, Philomath, OR. Prior to her new position, Knuth was with the Department of Biology, Western Oregon University, Philomath, OR.

**Grant Bryce McClelland** has transferred to the Department of Biology, Queen's University, Kingston, Ontario, Canada. McClelland formerly was with the Department of Integrative Biology, University of California, Berkeley, CA.

**William E. Mitch** recently became Chairman, Department of Internal Medicine, University of Texas Medical Branch, Galveston, TX. Prior to his new position, Mitch was with the Renal Division, Emory University School of Medicine, Atlanta, GA.

**Niall Michael Moyna** has changed his location from the Department of Cardiology, Hartford Hospital, Hartford, CT and has affiliated with the Faculty of Science and Health, Dublin City University, Dublin, Ireland.

**David Robertshaw** has accepted the position of Associate Dean for Premedical Education, Weill Cornell Medical College, Doha, Qatar. Prior to his new post, Robertshaw was associated with the Department of Biomedical Sciences, Cornell University, Ithaca, NY.

**Kurt W. Saupe** has moved from the Department of Medicine, Boston University School of Medicine, Boston, MA, to join the Department of Medicine, University of Wisconsin, Madison, WI.

**Wei Sun** has affiliated with the Department of Biochemistry, Walter Reed Army Institute of Research, Silver Spring, MD. Prior to his new position, Sun had been associated with the Department of Internal Medicine, University of Iowa, Iowa City, IA.

**Ann Margaret Swartz** recently affiliated with the Department of Physical Medicine and Rehabilitation, University of Michigan, Ann Arbor, MI. Swartz was formerly with the Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY.

**Jamie Ian Vandenberg** joined the Department of Electrophysiology & Biophysics, Victor Chang Cardiac Research Institute, Darlinghurst, Australia. Vandenberg had been affiliated with the Department of Biochemistry, Cambridge University, Cambridge, England.

**Oliver Zeitz** has moved from the Department of Cardiology, University Hospital, Goettingen, Germany to the Universitätsklinik, Hamburg, Germany.

❖



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Pages 89-96: Best PM and Joshua IG. "Association of Chairs of Departments of Physiology 2001 Survey Results." In

Table 5 (p. 94 and 95), column 8 incorrectly listed "Total Space" instead of "Research Space" only. However, the original values under column 10 ("Research Dollars/sq.ft.") were cor-

rect in that they were divided by research space and not total space. We apologize for the error. ❖

**Table 5. Complete Ranking According to Total Dollars**

Rank	Total Dollars	Rank Research Grant Dollars	Research Grant Dollars	Rank Research Dollars/ Faculty	Research Dollars/ Faculty	Rank Total Research Space	Research Space (sq. ft.)	Rank Research Dollars/ sq. ft.	Research Dollars/ sq. ft.	No. of Faculty
1	\$18,638,347	1	\$16,029,926	2	\$667,914	1	41,428	7	\$387	24
2	18,630,853	3	13,920,327	1	928,022	8	31,125	3	447	15
3	16,361,233	2	14,033,250	4	501,188	2	38,157	8	368	28
4	13,800,705	7	6,747,882	24	259,534	33	20,147	11	335	26
5	12,372,266	4	9,309,958	10	310,332	16	26,333	9	354	30
6	12,141,506	6	6,945,120	31	231,504	26	23,039	16	301	30
7	11,510,819	13	6,065,743	8	356,808	55	12,681	2	478	17
8	10,824,566	8	6,745,956	9	321,236	6	33,720	39	200	21
9	10,591,413	10	6,626,807	16	288,122	14	27,396	30	242	23
10	10,108,284	16	5,529,348	23	263,302	19	25,389	35	218	21
11	9,909,081	9	6,663,187	17	277,633	5	35,500	44	188	24
12	9,318,106	5	7,056,000	13	294,000	12	28,177	27	250	24
13	9,308,041	71	1,707,255	80	68,290	15	26,500	83	64	25
14	9,272,202	11	6,249,690	6	390,606	35	19,761	13	316	16
15	8,830,568	19	5,154,307	20	271,279	3	36,063	62	143	19
16	8,828,745	20	5,112,369	21	269,072	7	32,665	56	157	19
17	8,785,446	18	5,412,452	41	193,302	11	28,183	42	192	28
18	8,717,074	15	5,744,867	42	191,496	27	22,823	26	252	30
19	8,635,194	14	5,966,989	12	298,349	30	21,334	19	280	20
20	8,533,320	27	4,619,925	32	230,996	45	16,227	18	285	20
21	8,451,036	24	4,839,771	7	372,290	4	35,879	66	135	13
22	8,035,169	21	5,009,691	27	250,485	13	27,567	49	182	20
23	7,584,000	17	5,500,000	5	392,857	10	29,000	43	190	14
24	7,394,109	12	6,243,435	3	624,343	46	15,955	5	391	10
25	7,338,555	30	4,073,726	39	193,987	36	19,707	36	207	21
26	7,025,845	25	4,748,001	28	249,895	42	17,479	20	272	19
27	6,912,601	29	4,100,195	14	292,871	29	22,028	46	186	14
28	6,740,227	23	4,918,753	43	189,183	23	24,105	38	204	26
29	6,633,870	22	4,992,290	34	208,012	18	25,929	41	193	24
30	6,622,849	33	3,800,000	54	158,333	20	24,522	57	155	24
31	6,326,856	39	3,105,321	47	182,666	31	20,521	60	151	17
32	6,310,020	28	4,107,024	45	186,683	24	23,932	50	172	22
33	6,307,012	53	2,433,874	79	81,129	41	17,737	64	137	30
34	6,298,862	26	4,715,665	30	235,783	39	18,027	22	262	20
35	6,265,140	34	3,565,092	58	155,004	17	26,234	65	136	23
36	5,814,495	40	3,093,591	59	154,680	59	12,398	28	250	20
37	5,552,315	66	1,987,000	68	116,882	85	5,100	6	390	17
38	5,461,549	67	1,982,842	81	66,095	21	24,241	81	82	30
39	5,338,035	45	2,619,612	73	109,151	25	23,891	75	110	24
40	5,290,281	48	2,558,636	63	142,146	34	20,104	70	127	18
41	5,253,519	42	3,000,000	19	272,727	84	5,404	1	555	11
42	5,074,916	36	3,314,272	11	301,297	51	14,348	31	231	11
43	5,042,342	32	4,039,839	33	224,436	40	17,828	32	227	18

**Table 5. Complete Ranking According to Total Dollars**

Rank	Total Dollars	Rank Research Grant Dollars	Research Grant Dollars	Rank Research Dollars/ Faculty	Research Dollars/ Faculty	Rank Total Research Space	Research Space (sq. ft.)	Rank Research Dollars/ sq. ft.	Research Dollars/ sq. ft.	No. of Faculty
44	\$5,021,007	44	\$2,693,017	61	\$149,612	44	16,372	52	\$165	18
45	5,002,565	37	3,224,492	22	268,708	61	11,993	21	269	12
46	4,998,517	51	2,452,165	53	163,478	74	8,385	17	292	15
47	4,824,874	43	2,769,308	26	251,755	58	12,423	33	223	11
48	4,694,794	31	4,044,895	35	202,245	28	22,117	48	183	20
49	4,621,439	54	2,373,908	64	139,642	32	20,464	71	116	17
50	4,570,184	56	2,322,902	40	193,575	71	9,118	24	255	12
51	4,532,686	59	2,200,850	65	137,553	37	19,600	73	112	16
52	4,427,103	52	2,446,906	44	188,224	47	15,259	54	160	13
53	4,421,348	38	3,122,788	29	240,214	65	9,949	14	314	13
54	4,149,130	46	2,605,447	15	289,494	79	7,596	10	343	9
55	4,065,745	47	2,583,573	46	184,541	64	10,257	25	252	14
56	3,948,702	64	1,994,417	66	124,651	22	24,160	80	83	16
57	3,888,862	73	1,610,031	36	201,254	60	12,251	68	131	8
58	3,864,687	69	1,836,869	70	114,804	75	8,350	34	220	16
59	3,804,595	49	2,524,647	72	109,767	9	30,461	79	83	23
60	3,795,406	50	2,503,497	57	156,469	54	13,648	47	183	16
61	3,771,702	55	2,368,824	55	157,922	72	9,070	23	261	15
62	3,657,010	41	3,052,685	18	277,517	50	14,857	37	205	11
63	3,648,171	65	1,991,165	48	181,015	56	12,500	55	159	11
64	3,574,715	35	3,344,403	38	196,730	76	8,220	4	407	17
65	3,566,477	57	2,315,698	51	165,407	53	14,097	53	164	14
66	3,520,515	60	2,147,790	74	102,276	43	16,699	69	129	21
67	3,330,766	75	1,497,311	69	115,177	77	8,023	45	187	13
68	3,281,017	58	2,312,695	52	165,193	80	7,253	12	319	14
69	3,260,787	70	1,780,809	67	118,721	62	10,765	51	165	15
70	3,232,517	72	1,622,555	76	95,444	63	10,526	58	154	17
71	3,173,427	61	2,041,729	50	170,144	38	19,030	76	107	12
72	3,161,747	63	2,005,000	37	200,500	49	14,881	67	135	10
73	3,130,430	68	1,931,789	62	148,599	78	7,793	29	248	13
74	3,128,765	62	2,015,716	25	251,965	82	6,566	15	307	8
75	2,791,046	74	1,510,110	60	151,011	66	9,882	59	153	10
76	2,767,411	82	734,951	83	45,934	81	6,950	77	106	16
77	2,646,119	76	1,443,102	49	180,388	67	9,825	61	147	8
78	2,640,856	83	671,950	85	31,998	48	15,000	86	45	21
79	2,600,337	80	1,019,000	78	92,636	70	9,131	74	112	11
80	2,573,369	81	899,021	82	56,189	68	9,809	78	92	16
81	2,485,345	78	1,306,826	75	100,525	69	9,242	63	141	13
82	2,173,200	85	350,000	86	29,167	83	5,500	84	64	12
83	2,131,781	79	1,125,000	71	112,500	52	14,116	82	80	10
84	2,088,033	77	1,418,550	56	157,617	57	12,470	72	114	9
85	1,280,710	84	659,960	77	94,280	89	3,400	40	194	7
86	1,013,350	86	216,067	84	43,213	87	3,741	85	58	5
87	1,000,478	87	114,541	87	19,090	73	8,483	89	14	6
88	815,926	88	81,000	88	13,500	90	2,600	87	31	6
89	481,259	89	60,411	89	12,082	88	3,527	88	17	5
90	89,354	90	0	90	0	86	4,570	90	0	10

## AAAS Award for Public Understanding of Science and Technology

The AAAS Award for Public Understanding of Science & Technology, established in 1987, recognizes scientists and engineers who make outstanding contributions to the “popularization of science.” A monetary prize of \$5,000, a commemorative plaque, complimentary registration, and reimbursement for reasonable travel and hotel expenses to attend the AAAS Annual Meeting to receive the prize are given to the recipient.

**Criteria:** The Award shall be given annually to scientists or engineers who, while working in their fields, have also contributed substantially to public understanding of science and technology. Types of activities to be considered include books, magazines, and newspaper articles; broadcasting; lecturing; museum presentation and exhibit design; and other public outreach activities, local, national, or international. Nominators are encouraged to identify candidates whose contributions reach broad audiences that include women, minorities, disabled persons, and senior citizens.

**Eligibility:** Eligible individuals include scientists and engineers (individual or a small group) from all disciplines (including social sciences and medicine) engaged in research, teaching, and related activities that have

contributed substantially to the public’s understanding of science or technology. Only materials produced for general audiences, as opposed to professional or trade audiences, will be considered. Employees of the AAAS are not eligible.

**Entries:** All nominations must be printed or typed and submitted fully completed and postmarked on or before midnight, **August 1, 2002**. Nominations may be made by AAAS affiliate organizations, universities, government agencies, media, research organizations, and individuals. Prior nomination does not exclude a candidate from consideration in subsequent years. The panel of judges will include distinguished scientists, engineers, and science communicators named by AAAS. The decisions of the Panel will be final. During the Award year, AAAS may ask winners to contribute to public understanding of science by speaking to groups of AAAS constituencies, helping to identify people to work with youth and the public, and participating in other AAAS activities related to public communication of science.

**Nomination Procedures:** You should provide: name, position, institution, professional address and Email, professional phone and fax, home address and home phone num-

ber of the candidate; name, position, institution, and professional address and phone of the nominator; a statement of the action or actions that form the basis for the nomination; the candidate’s vitae; the names of two supporting persons whom AAAS may contact for more information on the candidate and his/her/their contributions; and at least one representative sample which illustrates the nominee’s contribution. Books, videotapes, brochures, magazine articles, or other materials are appropriate.

All materials become the property of AAAS.

Please submit all information to: Public Understanding Awards Coordinator, Education & Human Resources Directorate, American Association for the Advancement of Science, 1200 New York Avenue, NW Room 608, Washington, DC 20005; Tel.: 202-326-6670; Fax: 202-371-9849; Email: [jkass@aaas.org](mailto:jkass@aaas.org).

Please contact AAAS for a list of past recipients.

**Deadline:** All materials must be received by **August 1**. ❖

## Fulbright Offers Lecturing/Research Grants in 140 Countries

The Fulbright Scholar Program is offering lecturing/research awards in some 140 countries for the 2003-2004 academic year.

Opportunities are available not only for college and university faculty and administrators, but also for professionals from business and government, as well as artists, journalists, scientists, lawyers, independent scholars and many others. There are awards in 37 different disciplines and professional fields.

Traditional Fulbright awards are

available from two months to an academic year or longer. A new short-term grants program—the Fulbright Senior Specialists Program—offers two- to six-week grants in a variety of disciplines.

Application deadlines for 2003-2004 awards are:

**August 1** for Fulbright traditional lecturing and research grants worldwide

**November 1** for the summer German Studies Seminar and for spring/summer seminars in Germany,

Korea, and Japan for academic and international education administrators

**Fulbright Senior Specialists Program:** rolling deadline.

For information, contact the Council for International Exchange of Scholars (CIES) at 3007 Tilden Street, NW, Suite 5L, Washington DC 20008-3009. Tel.: 202-686-7877; Email [apprequest@cies.iie.org](mailto:apprequest@cies.iie.org). Information and an online application are also available online at <http://www.cies.org>. ❖

## Charles E. Culpeper Scholarships in Medical Science

The Rockefeller Brothers Fund is currently accepting applications for its 2003 Charles E. Culpeper 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 United States medical schools or equivalent US educational institutions on behalf of candidates who are US citizens or aliens who have been granted permanent US resident (proof required); who have received their MD degree from a US medical school or

the equivalent of an MD degree from an educational institution equivalent to a US Medical School in 1994 or later (except under extraordinary circumstances, as approved by the Fund before submittal); and who 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 sub-

stantial contributions to science as academic physicians. Since January 1988, 49 physicians have been selected as Charles E. Culpeper Medical Scholars.

Deadline for applications is **August 15, 2002**. Awards will be announced in January 2003, for activation on or about July 1, 2003. Application forms and instructions may be obtained online at <http://www.rbf.org> or by contacting the Rockefeller Brothers Fund, 437 Madison Avenue, 37th floor, New York, NY 10022-7001, Tel.: 212-812-4200; Fax: 212-812-4299. ❖

**Experimental Biology 2003, Date Change**  
**Mark your calendar!**  
**Experimental Biology 2003 will be held from**  
**April 11-April 15, 2003.**

## Call for Nominations for the Editorship of *News In Physiological Sciences*

Nominations are invited for the editorship of *News in Physiological Sciences* to succeed S.G. Schultz, who will complete his term as Editor on June 30, 2003. The Publications Committee plans to interview candidates in October, 2002. Applications should be received before

**August 15, 2002**. Nominations, accompanied by a curriculum vitae, should be sent to the Chair of the Publications Committee: Dr. Dale J. Benos, Publications Department, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. ❖

## Call for Nominations for the Editorship of *American Journal of Physiology-Gastrointestinal and Liver Physiology*

Nominations are invited for the editorship of *American Journal of Physiology-Gastrointestinal and Liver Physiology* to succeed M.F. Kagnoff, who will complete his term as Editor on June 30, 2003. The Publications Committee plans to interview candidates in October, 2002. Applications

should be received before **August 15, 2002**. Nominations, accompanied by a curriculum vitae, should be sent to the Chair of the Publications Committee: Dr. Dale J. Benos, Publications Department, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. ❖

## Call for Nominations for the Editorship of *Physiological Genomics*

Nominations are invited for the editorship of *Physiological Genomics* to continue the tradition started by its Founding Editor, V.J. Dzau, who will complete his term as Editor on June 30, 2003. The Publications Committee plans to interview candidates in October, 2002.

Applications should be received before **August 15, 2002**. Nominations, accompanied by a curriculum vitae, should be sent to the Chair of the Publications Committee: Dr. Dale J. Benos, Publications Department, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991. ❖

## 30th Annual Current Topics in Geriatrics

This course is designed to provide practical information for physicians who care for elderly patients. The demographic imperative of our aging population is well-known. Many primary care physicians see mostly elderly patients. The objectives will be achieved through didactic presenta-

tions, question and answer sessions, small group sessions, and informal exchange.

Fee: Physicians: \$450; Residents: \$350.

Location: Renaissance Harborplace Hotel, Baltimore, MD.

For further information, contact the

Office of Continuing Medical Education, Johns Hopkins University School of Medicine, Turner 20, 720 Rutland Avenue, Baltimore, MD 21205-2195. Tel.: 410-955-2959, Fax: 410-955-0807, Email: cmenet@jhmi.edu, Internet: <http://www.med.jhu.edu/cme>. ❖

## July 7-10

**73rd European Atherosclerosis Society Congress, Salzburg, Austria.** *Information:* 73rd EAS Congress, c/o Kenes International, PO Box 50006, Tel Aviv 61500, Israel. Tel: +972-3-5140018/9; Fax: +972-3-5140093; email: 73eas@kenes.com; Internet: <http://www.kenes.com/73eas>.

## July 7-12

**XIVth World Congress of Pharmacology, San Francisco, CA.** *Information:* Congress Secretariat, XIVth World Congress of Pharmacology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7010; fax: 301-530-7014; email: wcp@faseb.org; Internet: <http://www.iuphar2002.org>.

## July 9-14

**Enteric Nervous System 2003, Banff, Alberta, Canada.** *Information:* Keith Sharkey, Professor, Department of Physiology and Biophysics, University of Calgary, 3330 Hospital Drive NW, Calgary, Alberta, Canada T2N 4N1. Tel: 1-403-220-4601; Email: ksharkey@ucalgary.ca; Internet: <http://www.med.ucalgary.ca/webs/ENS/>.

## July 21-26

**Sixth International Symposium on the Neurobiology and Neuroendocrinology of Aging, Bregenz, Austria.** *Information:* Richard Falvo or Andrzej Bartke, Department of Physiology, LS II, Room 245, Southern Illinois University School of Medicine, Carbondale, IL 62901-6512. Fax: 618-453-1517; Email: abartke@siu.edu or rfalvo@siu.edu; Internet: <http://www.neurobiology-and-neuroendocrinology-of-aging.org>

## August 8-14

**10th International Conference on Na,K-ATPase and Related Cation Pumps, Elsinore, Denmark.** *Information:* Organized by Copenhagen University, Denmark. Internet: <http://www.aki.ku.dk/ATPase2002>

## August 18-September 13

**Signalling in Muscle Metabolism, Copenhagen, Denmark.** *Information:* Baltic Summer School Secretariat, Rigshospitalet dept. 7652, Blegdamsvej 9, 2100 Copenhagen Ø, Denmark. Tel: +45 3545 7595; Fax: +45 3545 7634; Internet: <http://www.balticsummerschool.org>.

## August 24-28

**The Power of Comparative Physiology: Evolution, Integration, and Application, San Diego, California.** *Information:* The American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7171; Fax: 301-571-8313; Email: meetings@the-aps.org; Internet: [http://www.the-aps.org/meetings/aps/san\\_diego/home.htm](http://www.the-aps.org/meetings/aps/san_diego/home.htm).

## August 31-September 4

**5th International Congress of Neuroendocrinology, Bristol, UK.** *Information:* Helen Gregson, Conference Secretariat, BioScientifica Ltd., 16 The Courtyard, Woodlands, Bradley Stoke, Bristol BS32 4NQ, United

Kingdom. Tel: +44-1454-619347; Fax: +44-1454-616071; email: ICN2002@endocrinology.org; Internet: <http://www.bioscientifica.com/ICN2002.htm>.

## September 4-8

**56th Annual Meeting and Symposium of the Society of General Physiologists on "Trafficking of Transporters," Woods Hole, MA.** *Information:* Society of General Physiologists, Tel: 508-540-6719; Fax: 508-540-0155; Email: sgp@mbl.edu; Internet: <http://www.sgpweb.org>.

## September 6-9

**3rd International Workshop: Mechano-Electric Feedback and Cardiac Arrhythmias, Oxford, UK.** *Information:* Peter Kohl, MD, PhD, RSRF, Head, Cardiac MEF Lab, University Laboratory of Physiology, Parks Road, Oxford OX1 3PT, UK. Fax: +44-(0)-1865-272-554; email: peter.kohl@physiol.ox.ac.uk.

## September 12-15

**4th World Congress on Stress, Edinburgh, Scotland.** *Information:* Northern Networking Ltd., Congress Central Office, 813 South Street, Glasgow G14 0BX, Scotland, UK. Tel: +44 (0) 141 954 4441; Fax: +44 (0) 141 954 2656; Email: stress@glasconf.demon.co.uk; Internet: <http://www.stress-conf.co.uk/>.

## September 14-18

**European Respiratory Society (ERS) Annual Congress, Stockholm, Sweden.** *Information:* ERS Headquarters, 1, boulevard de Grancy, CH - 1006 Lausanne. Tel: +41 21 613 02 02; Fax: +41 21 617 28 65; Email: info@ersnet.org; Internet: <http://www.ersnet.org>.

## September 18-20

**Physiome 2002—70eme Reunion De La Societe De Physiologie, L'Hotel Gouverneur de Sainte-Foy, Quebec, Canada.** *Information:* Dr. E. Rousseau, Department de Physiologie et Biophysique, Faculte de Medecine, Universite de Sherbrooke, J1H 5N4 Sherbrooke, QC, Canada; Tel: +819 564 53 06; Fax: +819 564 53 99; Email: erouss01@courrier.usherb.ca; Internet: <http://physiome2002.chus.qc.ca>.

## September 19-24

**7th International Symposium on Dendritic Cells, Bamberg, Germany.** *Information:* Internet: <http://www.dc2002.de/>

## September 20-24

**24th Annual Meeting of the American Society for Bone and Mineral Research, San Antonio, TX.** *Information:* ASBMR, 2025 M St., NW, Ste. 800, Washington, D.C. 20036-3309; Tel: (202) 367-1161; Fax: (202) 367-2161; Email: asbmr@dc.sba.com; Internet: <http://www.asbmr.org>.





# MEMBERSHIP APPLICATION FORM

## THE AMERICAN PHYSIOLOGICAL SOCIETY

### Tphys4.02

Check membership category you are applying for:  Regular  Affiliate  Student

Do you currently hold membership in the APS?  Yes  No

If you answered yes to above, what is your category of Membership? \_\_\_\_\_ Year elected? \_\_\_\_\_

Name of Applicant: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Last Name or Family Name First Name Middle Name

Date of Birth \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ Optional: Male  Female   
Month Day Year

Institution Name \_\_\_\_\_ Department \_\_\_\_\_

Institution Street Address \_\_\_\_\_

City/State/Zip/Country \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

E-mail \_\_\_\_\_

### EDUCATIONAL STATUS

\*(Important: if you are enrolled as a student, include the degree and pending date of completion)

Dates*	Degree*	Institution	Major Field	Advisor
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DOCTORAL DISSERTATION TITLE (if applicable): \_\_\_\_\_

POSTDOCTORAL RESEARCH TOPIC (if applicable): \_\_\_\_\_

**SPONSORS** (Sponsors must be APS Members. If you are unable to find sponsors, mail or fax this form to the address on the back of this form and we will locate them for you.)

Check this box if applicable:  Please locate sponsors on my behalf.

#1 Sponsor Name \_\_\_\_\_

#2 Sponsor Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

Mailing Address \_\_\_\_\_

Phone \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Fax \_\_\_\_\_

E-mail \_\_\_\_\_

E-mail \_\_\_\_\_

Sponsor Signature\* \_\_\_\_\_

Sponsor Signature\* \_\_\_\_\_

*\*signature indicates that sponsor attests applicant is qualified for membership.*

**Please turn over for 2 more questions...and mailing instructions.**



# Membership Application (Continued...)

Applicant Last Name (please print) \_\_\_\_\_

## OCCUPATIONAL HISTORY [ Check if student ]

### Current Position:

Dates	Title	Institution	Department	Supervisor
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### Prior Positions:

Dates	Title	Institution	Department	Supervisor
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## LIST YOUR PUBLICATIONS FROM THE PAST 5 YEARS (List them in the same style as sample below).

**Sample:** Cheung, Stephen S., and Tom M. McLellan. Heat acclimation, aerobic fitness, and hydration effects on tolerance during uncompensable heat stress. *J. Appl. Physiol.* 84(5): 1731-1739, 1998.

### **IMPORTANT INFORMATION:**

**Do not include a curriculum vitae or reprints.**

**Mail your application to:** Membership Services Department, The American Physiological Society  
9650 Rockville Pike, Bethesda, Maryland 20814-3991 (U.S.A.)

**Send no money now:** You will receive a dues statement upon approval of membership.

**Approval Deadlines:** Regular membership applications are considered for approval by the Council three times per year. Student and Affiliate membership applications are accepted monthly upon approval of the Executive Director of the Society.

**Questions? Call: 301-530-7171 ■ Fax: 301-571-8313 ■ E-mail: [members@aps.faseb.org](mailto:members@aps.faseb.org) ■ Web: [www.the-aps.org](http://www.the-aps.org)**

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