NOVEMBER 2003

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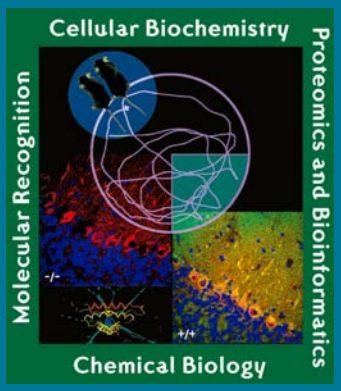

"A Molecular Exploration of the Cell"

ASBMB Annual Meeting
and 8th IUBMB Conference
June 12-16, 2004
Boston, Massachusetts

Dr. Roderick MacKinnon

ASBMB Members Share Nobel

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Dr. Peter Agre

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NOVEMBER 2003,
Volume 2, Issue 8

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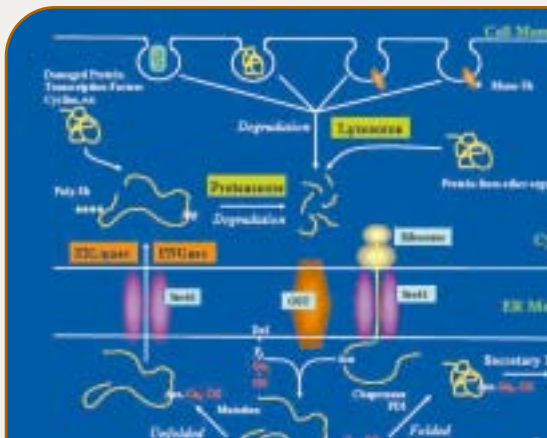

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Comments

Please direct any comments or questions concerning *ASBMB Today* to:

John D. Thompson
Editor, *ASBMB Today*
9650 Rockville Pike
Bethesda, MD 20814-3996
Phone: 301-634-7145; Fax: 301-634-7126
E-mail: jthompson@asbmb.faseb.org

A Crisis Developing in Biology

In a recent publication, *ASBMB Today*, August 2003, Sydney Brenner contends, quote, "there is now a crisis developing in biology, in that completely unstructured information does not achieve understanding." *The Scientist*, in an editorial describes the problem as, quote, "data overload, absence of reproducibility, and lack of an appropriate conceptual framework." Another recent article defines the problem as, quote, "Separating the Curd from the Whey." Still another article has the heading, "Databases Grow, and Grow, —- and GROW."

I recently wrote to Dr. Brenner on this problem and defined it by stating that all of us are literally drowning in data because this immense mass of uncollated and non-integrated data does not permit understanding biological mechanisms or function. The crux of the problem seems to be that we have developed a current generation of scientists with a mind set on automation who use this generation of data as a substitute for thinking and the hard difficult mental work required for making sense out of the data. We seem to have forgotten that computers do not think. Garbage in, garbage out.

In wrestling with this problem, the question arose as to how can we cope with this problem of re-orienting our thinking and that of students back to the essence of scientific discovery, rather than mindless generation of data. It has become so bad that our current generation of editors consider data to be outdated or meaningless if it is more than five years old.

It seems to me that the members of the Lasker Award Jury are in a unique position to address this problem by virtue of the guidelines used and publicized in making the awards and by the fact that the Nobel Committee has high regard for the merit of the Lasker Award. Could a criteria of merit for the Lasker Award address not only the discovery meriting the Award but also the collation and integration of data which led to the discovery?

A recent review which I wrote was published in *Cardiovascular Engineering, An International Journal,* Vol. 2, No. 3, September 2002. That review, Atherogenesis: Historical Perspective, Biochemical Mechanism, and Current Status, provides examples of discovery based on collation and integration of unstructured data. Also, see *Naturwissenschaften* 80:547-555, 1993.

With best regards, I am,

Sincerely,

Laurence Pilgeram, Ph.D.
PO Box 1583
Goleta Station
Santa Barbara, California 93116

Tell Us What You Think

We appreciate receiving letters that are suitable for publication from ASBMB members regarding issues of importance or commenting on articles appearing in *ASBMB Today*. Letters should be sent to the editor, John Thompson, at the address found at left. Letters must be signed and must contain the writer's address and telephone number. The editor reserves the right to edit all letters.

Marc Kirschner to Head Harvard's New Systems Biology Department

Harvard Medical School has made a significant commitment to the emerging field of systems biology in the creation of the Department of Systems Biology (DSB), one of the first such department-levels in the nation. The Department of Systems Biology will be Harvard Medical School's first completely new department in more than two decades and, with more than 20 faculty recruitments expected, will be one of its largest departments.

A quantitative understanding of an entire subcellular, cellular, or organism system could dramatically speed drug discovery, by allowing one to predict the effects of attacking a specific target within the context of the complex cellular circuits. New drugs often fail after the expenditure of millions of dollars, because the effect on a single gene or protein target in the test tube fails to have the predicted effect when tested in the human body.

"As we understand more about the tiniest pieces that we are made of, it becomes increasingly clear that we do not understand how they work together as systems," said ASBMB member Dr. Marc Kirschner, the first chair of the new department. "We need to build on the foundation of molecular biology to construct an understanding of the architecture of the cell and how cells cooperate across organ systems, with a predictive model of physiology as the ultimate goal.

"In many ways systems biology is a logical extension of physiology and biochemistry and like these fields it has strong roots in mathematical modeling and quantitative measurement. In its modern guise it attempts to yield molecular descriptions of complex cellular and multicellular systems. It fills an important current gap in both teaching and research."

"It is worrying that we do not understand how most drugs work and essential that we know in detail how both genetic mutations and the environment contribute to disease," said Joseph B. Martin, Dean, Harvard Medical School. "Answering such questions requires building predictive models of cells, organs, and ultimately, organisms. And this requires not only advanced computational models but the acquisition of new quantitative data, often with new methods capable of interrogating the activity of a large number of genes within whole cells or whole organisms. In evaluating this challenge, we reached the conclusion that the scale of the effort required demands a new department."

"This type of focused, department-based program will help to define and stimulate the exciting interdisciplinary field of systems biology, which needs strong leadership right now," said Bruce Alberts, President of the National Academy of Sciences and a member of the outside review panel that helped Harvard Medical School decide on priorities for the coming years. "With the guidance provided by Marc Kirschner, a proven builder of new departments, I would expect this new endeavor to have a profound impact on biology over the long term."

The new department will include faculty from areas such as mathematics, computer sciences, physics, and engineering, as well as traditional biomedical fields; talent from broad disciplines that can develop the theoretical framework for complex systems biology problems. More than 20 fulltime faculty will be recruited and the new Systems Biology Department will receive significant initial funding from Harvard University and Harvard Medical School. The new department will have special programs for the education of physical scientists in biology and special core facilities to promote interaction between disciplines. DSB will also be inter-institutional, linking faculty from the Medical School with faculty at its affiliated hospitals and Harvard University.

> *"Systems biology is a logical extension of physiology and biochemistry..."*
>
> Dr. Marc Kirschner

About the new department's leader

Dr. Kirschner, a pioneering biological scientist, has extensive experience both developing new departments and creating interdisciplinary efforts. He has received Canada's Gairdner Award, Israel's Shacknai Prize, and ASBMB's William C. Rose Award (2001), and in December of this year, will receive the American Society for Cell Biology's E.B. Wilson Medal.

Seeking Balance in an

By John D. Thompson, Editor

For life science researchers, a balanced approach is necessary in order to defend against bioterrorism without hindering research that is essential to the health of the nation's people.

That is the conclusion of a report, *Biotechnology Research in an Age of Terrorism: Confronting the Dual Use Dilemma*, released last month by the National Academies' National Research Council (NRC).

The NRC report rejected the establishment of a "top-down," system requiring mandatory review of experiments, due to concern that this would slow the progress in biotechnology, "which has revolutionized the practice of medicine," according to Gerald Fink, Professor of Genetics at the Whitehead Institute for Biomedical Research, Massachusetts Institute of Technology, who chaired the committee that wrote the report.

The report also rejects restrictions on the freedom of journal editors to publish federally funded fundamental research, unless the federal government had previously given it a national security classification. "The challenge is for the scientific community to develop a system that permits fundamental research to proceed unimpeded, while identifying research with great potential for misuse," according to the NRC report.

The report recommends that the Department of Health and Human Services create an independent National Science Advisory Board for Biodefense to lead a new oversight system. Made up of top scientists and national-security experts, the board would provide expert scientific advice on the relative risks and benefits of new technologies, and alert the government to new opportunities for the development of vaccines and antibiotics. It also would promote ongoing dialogue between scientists and security experts, and advise the government on how life scientists could mitigate the risks of bioterrorism.

Reviewing Planned Experiments

The report proposes a tiered system of review to identify experiments that raise concerns due to their high potential for misuse. These are experiments that would:

- demonstrate how to render human or animal vaccines ineffective;
- confer resistance to therapeutically useful antibiotics or antiviral agents for humans, animals, or crops;
- enhance the virulence of human, animal, or plant pathogens, or make nonpathogens virulent;
- increase the transmissibility of pathogens;
- alter the host range of pathogens;
- enable the evasion of diagnostic or detection methods; or
- enable the weaponization of biological agents or toxins.

The first tier of review begins with a research establishment's Institutional Biosafety Committee (IBC). IBCs conduct their reviews using guidelines developed by NIH's Recombinant DNA Advisory Committee (RAC). With their expanded duties, it is anticipated that there would be only rare cases in which IBCs could not decide whether a proposed experiment should proceed. Such cases would be referred to the RAC, and possibly to the NIH Director, who could consult with the National Science Advisory Board for Biodefense.

Reviewing and Publishing Research Results

The new system also would include the review of study results from any experiments of concern that are approved. However, it states that decisions on whether results should be published need to be within the purview of the scientific community and not, the committee emphasized, the federal government.

This self-governing approach is different from the federal government's restriction on public access to "sensitive but unclassified" information in the life sciences. Experience shows, the report noted, that vague categories of this kind generate great uncertainties among both scientists and government officials, and inevitably stifle scientific creativity—and weaken national security.

Ongoing discussion among people involved in publishing scientific journals–and between journal editors and national-security experts–is essential to creating an effective system of review and oversight, the committee said. The

Age of Bioterrorism

proposed National Science Advisory Board for Biodefense could be a resource for producers of journals in the life sciences by, for example, providing access to examples of review procedures currently in use.

The general principle of the federal government's National Security Decision Directive 189 remains valid and should continue to be the basis for U.S. policy, the report says. That directive states, "No restrictions may be placed upon the conduct or reporting of federally-funded fundamental research that has not received national security classification, except as provided in applicable U.S. statutes."

Engaging the Scientific Community

To bring about significant and lasting change, the NRC report concludes, the American scientific community must become more deeply engaged in this issue. At the same time, a commitment is needed from the international scientific and policymaking communities to develop a counterpart to the committee's proposed oversight system for the United States, ultimately promoting greater security around the world.

The study was sponsored by the Sloan Foundation and the Nuclear Threat Initiative. Copies are available from the National Academies Press; tel. 202-334-3313 or 1-800-624-6242 or on the Internet at http://www.nap.edu. The cost of the report is $40 plus shipping charges of $4.50 for the first copy and $.95 for each additional copy.

Texas Stem Cell Advocates Meet,

By Peter Farnham, ASBMB Public Affairs Officer

The stories came quietly, matter-of-factly, one by one around the room, each one from a family member with a child or other loved one suffering from a chronic and so far incurable illness. Most poignant of all was this comment from a mom—"I was the mother of a juvenile diabetic."

This and other stories were heard during a meeting in Austin, Texas on October 5, that marked the first formal steps of grass roots research advocates in Texas to organize themselves into something more than a loose collection of individuals and smaller organizations with a common letterhead—Texans for the Advancement of Medical Research (TAMR)—but not much else in the way of tangible assets.

Not that the group hasn't been effective up to now—far from it. TAMR was formed just last spring and, operating on heart, energy, and hard work to make up for an almost non-existent budget, its accomplishments in the state legislature were little short of amazing.

From a standing start, this collection of ordinary people enduring extraordinary suffering managed to defeat legislation that would have outlawed somatic cell nuclear transfer—so-called research cloning. Even more remarkable, the victory was won despite the fact that the well-financed and organized effort to pass it was backed by the politically powerful right-to-life movement, introduced by a rising star in Republican politics in the Lone Star State—Rep. Phil King, chair of the state Regulated Industries Committee—and supported by the Republican leadership.

TAMR's weeks of hard work literally did not end until the last few hours of the 2003 legislative session, when its allies won the final showdown by a vote of 75-65. TAMR leaders expect to face a similar fight in the next legislative session and called the October 5 meeting to organize for the next battle.

TAMR is made up of individual patient advocates, most suffering from one or more of the worst scourges of the human condition still extant, as well as representatives of Texas chapters of such groups as the Parkinson's Action Network, the Juvenile Diabetes Research Foundation (JDRF), the Parkinson's Advocacy Coalition, Texans to Cure Paralysis, and others. Also present at the meeting were members of the Texas legislature who helped defeat the ban, as well as representatives of ASBMB—President Bettie Sue Masters and a staff member—and representatives of FASEB, including Dr. Ellen Kraig, a member of AAI and the FASEB Science Policy Committee, and Jill Adleberg, with the FASEB Office of Public Affairs.

A videotape of the floor debate on the SCNT ban in the Texas legislature was shown at the meeting, and the debate revealed a number of scientific misconceptions about stem cell research as well as what the federal anti-cloning legislation proposed by Senator Sam Brownback (R-KS) actually says. Nevertheless, an observer was struck by the overall quality of the videotaped debate, conducted with a level of comity often lacking in political discussions on such emotional topics.

The videotape was followed by a panel led by Rob Eissler, a freshman Republican state legislator and a key ally against the ban. "We've bought two years," he said of the victory. However, he cautioned that the proposed ban would certainly come up again. The Texas legislature meets every two years, and during the off-year members can commission "interim studies" on issues they expect to revisit. Rep. King has asked for an interim study on stem cell research—a clear signal that the ban will be revisited.

During the organizational portion of the meeting, ASBMB President Masters and several of her scientific colleagues said that they would continue to support TAMR, as ASBMB and FASEB did last spring.

TAMR's efforts were spearheaded by Beckie McCleery and Judy Haley, both active in their local chapters of the Juvenile Diabetes Research Foundation.

"This meeting was very successful," Mrs. McCleery said. "We need to take TAMR to the next level to ensure that vital research into regenerative medicine is not put at risk." TAMR is forming an organizing committee to identify its future shape and address such issues as tax status, incorporation, and fund-raising. TAMR also gave Rep. Eissler an award recognizing his efforts to defeat the proposed ban.

Both women spoke with *ASBMB Today* after the meeting. Judy Haley became involved in diabetes advocacy in 1990, when two of her three children were diagnosed with Type-1 diabetes. "They were 10 and 12 when they were diagnosed," she said. "The only way our family could cope with this disease was to proactively go after it. It wasn't enough to give them insulin shots; we had to try to fix the disease. So, every way we can, we are out there fighting."

Beckie McCleery had her own story. "My son has juvenile diabetes. He's 18 now, and was diagnosed when he was 14. Our world literally turned upside down. There's no history of the disease in our family and we were completely unprepared for it. We know juvenile diabetes is an autoimmune disorder, but we don't know what

Organize

Texas state legislator Rob Eissler (R-Woodlands) receives an award on October 5 in Austin from TAMR organizers (L to R) Judy Haley, Melinda Rose, and Beckie McCleery. Eissler was recognized for his efforts on behalf of stem cell research in Texas.

causes it. That's why it's so important that research continue on all fronts so we can understand its origin, and learn how to treat and cure it."

The illness in their children motivated both of them to get involved in grass roots advocacy. Last winter when the anti-stem cell research legislation was introduced, Mrs. Haley began seeking advice from the national office of JDRF, which suggested she contact other local JDRF chapters in Texas. "That's how Beckie came in," she said. The two of them, along with Dr. Bill Rainey, a plastic surgeon and himself a victim of a spinal cord injury, and Terry Bowers, with the Texas chapter of the Parkinson's Action Network, "started getting together via telephone and e-mail and we realized that there were many of us who could fight on this issue." Further contacts led to their joining forces with Ellen Arnold, a state lobbyist in Austin who has a niece with diabetes. "Ellen got in it with her heart," Judy said, "because she was so touched by how incredibly difficult diabetes was for her niece. She didn't want to see some potential cure disappear because of the whim of a legislator who perhaps didn't understand the issue."

Beckie McCleery got active in JDRF through her husband, but had no idea she was soon to be involved in such a tough legislative struggle. "This fight was probably the most controversial topic having to do with research Texas had ever faced. After the first hearing, I realized that the best thing for us to do was join together and be represented by one strong voice rather than by five or six different voices. And it worked—we had instant credibility when we walked into a legislator's office. And we had this incredible network. When we needed to have letters written, calls made, or people at the capitol, we could send one e-mail or make a series of phone calls and have people here in Austin to get what we needed very quickly. The legislators don't pay much attention to one or two people, unless you bring lots of money. But if a lot of constituents call, then we get their attention. And that's what we did."

Unfortunately, many states may be facing similar battles in the next several years. As of last spring, 22 state legislatures were considering stem cell legislation in some form. The number is only expected to grow as a stalemate continues on federal legislation in Washington.

The two moms both said they were self-taught advocates. Judy Haley said, "Our national organizations helped us understand what was going on at the federal level, and our volunteer lobbyist Ellen Arnold and others helped us at the state level."

Beckie McCleery added, "Ellen helped us find champions in both parties in the legislature who would take our fight forward. Then we could go to legislators and tell them that there were people in their party supporting our position." She laughed, "The last time I was in the state capitol building before this year was when I took my son there on a field trip. Believe me, if I can do this, anyone can do this."

Two ASBMB Members Selected to Share 2003

Peter Agre, Professor in the Department of Biological Chemistry at Johns Hopkins University Medical School, and Roderick MacKinnon, John D. Rockefeller Jr. Professor and Howard Hughes Medical Institute (HHMI) Investigator at Rockefeller University, will share the 2003 Nobel Prize in Chemistry for discoveries concerning channels in cell membranes. The pair, both medical doctors, were honored for discoveries clarifying "how salts (ions) and water are transported out of and into the cells of the body," according to the Royal Swedish Academy of Sciences. At the December 10 Prize Award Ceremony in Stockholm, the King of Sweden will present the Awards.

The Academy recognized Dr. Agre for his laboratory's 1991 discovery of the long-sought "channels" that regulate and facilitate water molecule transport through cell membranes, a process essential to all living organisms. Dr. MacKinnon was cited for "structural and mechanistic studies of ion channels."

Dr. Peter Agre

Dr. Agre

That the body's cells must contain specific channels—aquaporins—for transporting water was suspected as early as the middle of the nineteenth century. However, it was not until 1988 that Dr. Agre succeeded in isolating a membrane protein that, a year or so later, he realized must be the long-sought-after water channel subsequently named aquaporin. This decisive discovery opened the door to a whole series of biochemical, physiological and genetic studies of water channels in bacteria, plants and mammals. Today, researchers can follow in detail a water molecule on its way through the cell membrane and understand why only water, not other small molecules or ions, can pass.

"It is a remarkable honor to receive a Nobel Prize, because it not only recognizes discoveries, but also their usefulness to the advancement of fundamental science," said Dr. Agre. "It is amazing and gratifying that the Nobel committee feels our work has accomplished that milestone in just 12 years. That's warp speed in molecular chemistry and it could never have happened as fast as it did without the wonderful resources and collaborators available at Johns Hopkins. This is an honor for the entire Hopkins family."

"This is a great day for the school of Medicine and the University at large," said Edward D. Miller, Dean of the Medical Faculty and CEO of Johns Hopkins Medicine. "There are few happier occasions to celebrate at an academic medical center."

"This is a terrific day for Peter and a tremendous day for the Hopkins community," added Chi Dang, M.D., Vice Dean for Research at Johns Hopkins. "The prize is not only a recognition of the important discoveries on how materials are transferred into and out of cells, but it's also symbolic—in the case of Peter Agre—of being rewarded for a job superbly done with great depth, without fanfare. This should be an encouragement for the young scientists that persistence and dedication will yield the joy of discoveries and occasionally, fringe benefits. It also highlights that the prepared mind can turn serendipity, as in the case of the discovery of water channels, into a paradigm breaking moment."

William R. Brody, President of the Johns Hopkins University, commented, "The worldwide Johns Hopkins community joins with the School of Medicine in congratulating Peter for his laboratory's great achievement."

Since a 1992 paper in *Science* by Dr. Agre and Hopkins Physiologist Bill Guggino, which documented the discovery of the very first water channel protein, 10 more have been found in mammals, and hundreds more in plants, bacteria and other forms of life.

Nobel Prize in Chemistry

In Dr. Agre's lab alone, aquaporins have been discovered to be part of the blood-brain barrier and also associated with critical water transport in skeletal muscle, lung and kidney. Members of his lab also have found aquaporins in the eye and in salivary and tear glands. Researchers around the world now study aquaporins in many species of plants, bacteria and animals, and have linked aberrant water transport to a multitude of human diseases and conditions.

"I am so pleased that Peter has been recognized for his outstanding work on aquaporins," said Dr. Gerald Hart, Director of Biological Chemistry, the division housing Dr. Agre's laboratory. "He has been part of the Johns Hopkins family for more than 20 years, and we just couldn't be prouder."

> *"We still have much to learn, and the possibilities of where aquaporins will take us are unlimited."*
>
> Dr. Peter Agre

The discovery of aquaporin is an example of luck favoring the well-prepared. Beginning in the mid-1980s, he and his colleagues, including technician Barbara Smith and then post-doc Gregory Preston, were searching for proteins that are part of the Rh-factor when they happened across an abundant and much smaller protein. The researchers pursued the unexpected protein visitor—they isolated it and discovered that it was widely expressed—and within a year had cloned its complementary DNA. In dramatic experiments with frogs' eggs, the scientists next proved that the unknown protein was in fact biology's elusive cellular regulator of water transport.

Although Dr. Agre started his career in medicine, he gradually shifted to laboratory research so that he could investigate fundamental biological questions whose answers would have clinical relevance.

"I am certain that in the future, we will be able to capitalize on our understanding of aquaporins to benefit medicine, biotechnology and even agriculture," he says. "We still have much to learn, and the possibilities of where aquaporins will take us are unlimited."

Dr. MacKinnon

In 1998, Dr. MacKinnon and his colleagues determined the three-dimensional structure of a pore that allows cells to control their intake of potassium ions. By determining the structure of the potassium pore, or channel, he and his colleagues at Rockefeller University had solved a riddle that has perplexed biophysicists for decades: How does a potassium channel admit millions of potassium ions per second, while allowing only one smaller sodium ion to slip through for every 1,000 potassium ions?

Dr. Roderick MacKinnon

Potassium channels are part of the apparatus that maintains the normal ionic balance across the cell membrane. In excitable cells, like those in nerves and muscles, for example, the channels help re-establish the electrical difference between the inside and outside of the cells after excitation. Without potassium and sodium channels, neurons could not generate electrical signals and hearts could not beat rhythmically.

HHMI researchers at the University of California, San Francisco were the first to determine the DNA sequence of a potassium channel—the Shaker channel in fruit flies—in 1987. But even with that information in hand, it took several years for Dr. MacKinnon and his colleagues to figure out which amino acids actually formed the tunnel through which the ions passed. By using site-directed mutagenesis—painstakingly altering the protein by one amino acid at a time to determine the effects of such changes—the MacKinnon group eventually identified a "signature sequence" of eight amino acids that were key to the channel's function. They also demonstrated that potassium channels must consist of four subunits, each one contributing its signature-sequence amino acids to form a selectivity filter.

"We used mutagenesis for nearly 10 years to study how the potassium channel works without getting the answer we needed," says Dr. MacKinnon. Finally, though, he and his colleagues produced large quantities of the potassium channel from a bacterium named *Streptomyces lividans*. Then, they isolated the potassium

Continued on page 19

Life Scientist Salaries Reported

The median annual income reported in a recent survey of the compensation of life scientists was $65,000, according to a survey conducted by Abbott, Langer & Associates, Inc., Crete, Illinois, and sponsored by ASBMB. The composite highest-income practitioner in this field (salary plus cash bonus and/or cash profit sharing), taking into account the size of the organization, is the president with a median income of $120,000. Far toward the other end of the income spectrum, laboratory assistants have a median annual income of $23,600.

E-mail invitations to participate in the survey were sent to subscribers of *The Scientist* magazine, registrants on The Scientist web site who identified themselves as U.S.-based professional life scientists, members of and subscribers to the American Institute of Biological Sciences and the American Society for Biochemistry & Molecular Biology. An invitation to participate was also printed in *The Scientist*. Usable responses were received from over 12,600 individuals. The results are contained in the in-depth, 785-page survey report, Compensation of Life Scientists in the United States of America - 2003, available for $375 from Abbott, Langer & Associates, Inc., Dept. NR, 548 First Street, Crete, IL 60417 (www.abbott-langer.com). Similar editions are available for Canada and the United Kingdom.

Income data are reported by region, state, and metropolitan area; type of employer; size of organization; level of education; length of experience; primary area of specialization; primary job activity; level of professional responsibility; industry or service of employer; gender; age; years since highest degree; level of supervisory/managerial responsibility; and numerous cross-tabs of the variables.

Median incomes are highest in pharmaceutical, consulting, and manufacturing firms ($89,500, $87,000, and $82,500 respectively); and lowest in primary schools ($34,970), secondary schools ($45,775), and colleges/universities granting only 2-3 year degrees ($50,006).

Median total cash compensation from the survey report

Research Vice Presidents/Directors	$ 142,000
Research Managers	$ 139,000
Chief Operating Officers	$ 129,000
College/University Department Heads	$ 129,000
"Distinguished" Researchers	$ 126,000
Professors (12-month appointment)	$ 118,000
Research Section Heads	$ 108,387
Government Section Heads	$ 98,000
Laboratory Directors	$ 90,000
Research Unit Supervisors	$ 85,000
Professors (9-10 month appointment)	$ 85,000
Laboratory Managers	$ 53,000
Interrnediate Researchers	$ 50,250
Assistant Professors (9-10 month appointment)	$ 49,713
Post-Doctoral Researchers (12-month appointment)	$ 36,366
Laboratory Technicians	$ 35,000
Intermediate Research Technicians	$ 33,000

Chemists Moving into Life Sciences

With unemployment in chemistry at an all-time high, chemists are increasingly turning to industries in the life sciences, such as pharmaceuticals, that are not as hard-hit by economic woes.

Speaking at the American Chemical Society Annual Meeting in September, President-elect Charles P. Casey said that recent mergers and acquisitions among chemical and petrochemical companies have led to downsizing and fewer traditional jobs for chemists. In fact, employment among chemists is the weakest it has been since the ACS started consistently measuring it 30 years ago, he said, so ACS members are turning to careers in biology and pharmaceuticals, which appear "vital" enough to absorb "displaced chemists."

ACS surveys show that, in 1990, just over one quarter of ACS chemists under 40 years of age who were employed full-time in manufacturing were working in pharmaceuticals. But by 2000, that figure had risen to almost one half.

The ACS President-Elect said that this shift in employment among chemists does not necessarily mean that chemists and life scientists are now competing for the same jobs, since each group does very different work. However, he said, the influx of chemists into the world of life sciences does mean that both sides need to learn from each other and how best to interact, in order to benefit from the change.

Undergraduate students proudly display their winnings at the Annual Biomedical Research Conference for Minority Students (ABRCMS-www.abrcms.org) held October 15-18 in San Diego, California. ASBMB sponsored prizes for the best oral and poster presentations in the biochemical sciences. Each student received $250.00 and complimentary one-year student membership in ASBMB. from l to r: Dr. Phillip A. Ortiz, Empire State College; Oral presentation winner, Junior, Isaac Kinde, University of Maryland, Baltimore County; Senior poster winner, Jessae Carrington, Chicago State University, Junior poster winner, Juliette Sandifer, Tougaloo College; Sophomore poster winner, Annie Arguello, St. Mary's University, San Antonio, TX

Dr. Phillip A. Ortiz of Empire State College, Chair of the ASBMB Minority Affairs Committee, explains the benefits of student membership and the Undergraduate Affiliate Network at the Society for Advancement of Chicanos and Native Americans in Science (SACNAS-www.sacnas.org) meeting held in Albuquerque, New Mexico, October 2-5.

Second RGS Protein Colloquium

Saturday, April 17, 2004
Renaissance Hotel, Washington, DC
9:00 am - 6:00 pm

Chairs: Vadim Arshavsky and David Siderovski

RGS proteins: Past, present, future, David Siderovski, UNC - Chapel Hill
Mechanisms of feedback inhibition by RGS protein induction and turnover, Henrik Dohlman, UNC - Chapel Hill
RGS protein control of centrosome movement during mitosis in C. elegans embryos, Michael Koelle, Yale U.
Role of the RGS domain in G protein-coupled receptor kinase function, Jeffrey Benovic, Thomas Jefferson U.
RGS insensitive G proteins as probes of physiological RGS function, Richard Neubig, U. Mich
Regulation of vascular smooth muscle relaxation and blood pressure by RGS2, Michael Mendelsohn, Tufts U.
Investigation of RGS proteins toward modulation of neurobiological disorders, Kathleen Young, Wyeth Research
Functional analysis of RGS proteins in intact cells: Lessons from photoreceptors, Marie Burns, UC-Davis
Building RGS protein specificity through its domain composition, Vadim Arshavsky, Harvard Medical School and Massachusetts Eye and Ear Infirmary, Boston

Registration Deadline: March 31, 2004

Registration information is available online at www.aspet.org/public/meetings. Select Second RGS Colloquium. Or contact Margie Arkin, 301-634-7989, markin@aspet.org
Presented by: The Division for Molecular Pharmacology of the American Society for Pharmacology and Experimental Therapeutics. This is a satellite meeting to Experimental Biology 2004. Separate registration is required.

Protein Modifications and Turnover

Organizer: W. J. Lennarz, *Distinguished Professor and Chair, Department of Biochemistry and Cell Biology, State University of New York at Stony Brook*

This meeting will consist of six symposia between June 13 and 16, 2004. The overall theme of the meeting will be an intensive review of the current state of understanding of some of the major modifications carried out either co-translationally or post-translationally. This subject will be covered in the first two sessions. In the last three symposia the processes controlling protein degradation will be presented. In the figure below some of these processes are depicted diagrammatically.

Symposium 1: This symposium will be chaired by Dr. Lennarz. who will discuss the complexities of the enzyme oligosaccharyl transferase. This meeting will also include presentations by Dr. Chris Kaiser, on the formation of disulfide bonds, and by Dr. Shelley Berger on histone modifications.

There are many post-translational modifications and Dr. Gerald Hart will chair the second symposia which will focus on post-translational modification. He will talk about O-N-acetyl glucosamine modifications of proteins. Dr. Robert Haltiwanger will then discuss the various means by which glycosylation affects signal transduction, and Dr. Rui-Ming Xu will describe the structure of some of the enzymes involved in modification of the structure of histones.

The third symposium, to be chaired by Dr. Mark Lehrman, will deal with protein folding in The ER and will feature talks by Dr. Armando Parodi and Dr. Avadhesha Surolia on various aspects of the folding process that involves chaperones and lectin-like interactions.

The last three symposia will focus on the very active area of protein degradation. Session I will be chaired by Dr. Tom Rapoport and will deal with protein entering and exiting from the ER. Dr. Tadashi Suzuki will deal with the question of the fate of the oligosaccharide chains once misfolded proteins are exported out of the ER. Dr. Hidde Ploegh will consider other aspects of the degradation of misfolded proteins.

The second session focusing on the proteosome, will be chaired by Dr. Daniel Finley, who will talk about the mechanisms that regulate proteosome activity, whereas Dr. Alfred Goldberg will talk about the proteosome and the unfolding process. Dr. Peter-Michael K1oetzel will discuss antigen processing.

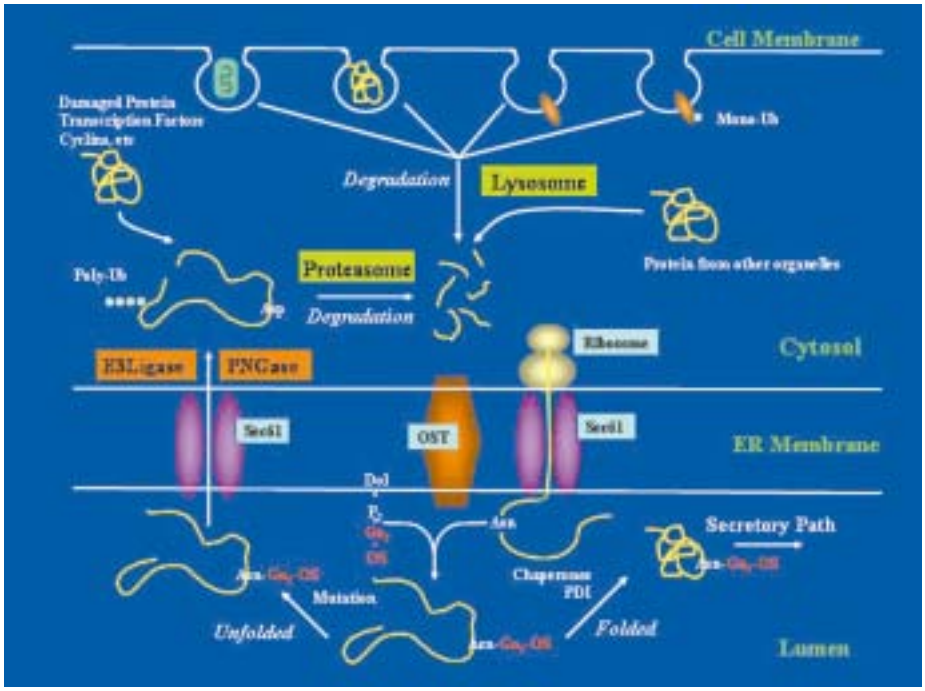
All of the symposia will be complemented by talks by scientists who have been chosen to speak based on their abstracts.

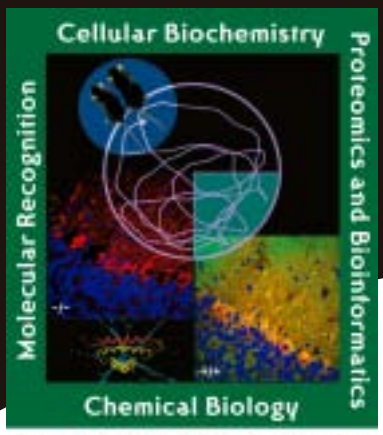
ASBMB Welcomes New Ph.D.s

ASBMB extends its congratulations to these individuals who recently received their Ph.D. degrees. In recognition of their achievement, ASBMB is presenting them with a free one-year membership in the Society. The new Ph.D.s are listed below with the institution from which they received their degree.

Steven A. Jacobs
University of Virginia

Jacob D. Mulligan
University of Wisconsin, Madison





"A Molecular Exploration of the Cell"

ASBMB Annual Meeting
and 8th IUBMB Conference
June 12 - 16, 2004
Boston, Massachusetts

Protein Modifications and Turnover Meeting

Organized by **William J. Lennarz**

SUNY at Stony Brook

Co/Post-translational Modification of Proteins

N-glycosylation
Chair, William J. Lennarz, *SUNY at Stony Brook*

Disulfide bond formation
Chris A. Kaiser, *MIT*

Histone modifications
Shelley L. Berger, *The Wistar Inst.*

Post-translational Protein Modifications

Function of addition of O-linked GlcNAc to proteins
Chair, Gerald W. Hart, *Johns Hopkins Univ. Sch. of Med.*

Regulation of signal transduction with glycosylation
Robert Haltiwanger, *SUNY at Stony Brook*

Structure of histone modifying enzymes
Rui-Ming Xu, *Cold Spring Harbor Lab.*

Folding in the ER

Control of N-glycosylation by the unfolded protein response
Chair, Mark A. Lehrman, *Univ. of Texas Southwestern Med. Ctr.*

The interplay of chaperones, lectins and enzymes in the ER folding process
Armando J. Parodi, *Fundacion Instituto Leloir*

Carbohydrate substrate recognition by calreticulin and calnexin and its role in protein folding in the ER
Avadhesha Surolia, *Indian Inst. of Sci.*

Degradation of Proteins I

Protein transport in and out of the endoplasmic reticulum
Chair, Tom Rapoport, *Harvard Med. Sch.*

Cytoplasmic PNGase implicated in proteosome-mediated degradation of misfolded glycoproteins
Tadashi Suzuki, *Univ. of Tokyo*

Degradation of misfolded proteins
Hidde Ploegh, *Harvard Med. Sch.*

Degradation of Proteins II

Regulation of proteosome activity
Chair, Daniel Finley, *Harvard Med. Sch.*

Proteosome and protein unfolding
Alfred Goldberg, *Harvard Med. Sch*

Proteosome and antigen processing
Peter-Michael Kloetzel, *Univ. of Berlin*

Degradation of Proteins III

Transcriptional control and the ubiquitin-proteosome system
Chair, William P. Tansey, *Cold Spring Harbor Lab.*

Ubiqutin and protein degradation
Aaron J. Ciechanover, *Technion-Israel Inst. for Tech.*

Lysosomal cysteine proteinases as key players in protein degradation
Vito Turk, *Josef Stefan Inst., Ljubljana, Slovenia*

Additional Speakers will be chosen from the abstracts submitted to the ASBMB Protein Modifications and Turnover topic categories.

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Abstract Deadline: February 4, 2004

Cellular Organization and Dynamics

Organizer: Harald Stenmark,
Norwegian Radium Hospital

The subdivision of eukaryotic cells into functionally separate organelles ensures that complex reactions such as receptor signaling, transciption, RNA processing and translation are compartmentalized.

This compartmentalization, which is considered crucial for the development of higher organisms, has historically been revealed by several techniques, among which electron microscopy has provided the strongest contribution. While the main functional compartments within a cell have probably been identified by now, we are still learning more about subcompartments within the nucleus and within the endomembrane system.

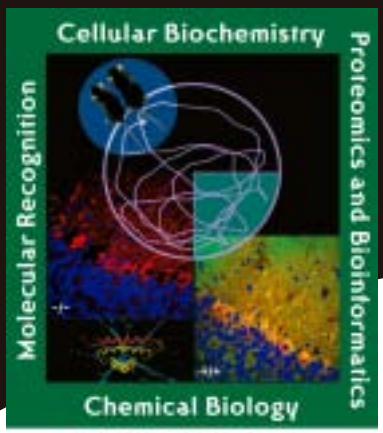
Moreover, recent technical advances in light microscopy have enabled us to study the organellar and molecular dynamics in living cells. But how is the subcompartmentalization of eukaryotic cells maintainted, and how do the biochemical reactions within each subcompartment contribute to cellular functions and intercellular communication?

The meeting on "Cellular Organization and Dynamics" will provide a state of the art view of how the cell is organized and highlight the dynamics of important cellular reactions. It will also provide our latest insight into the molecular mechanisms that regulate these processes.

Fluorescence microscopy has provided a powerful tool for detecting specific molecules within a cell. Not only can this technique be used for determining the subcellular localization of various gene products—in itself a crucial task in the postgenomic era. Recent improvements of fluorescence microscopy technicques, including the use of confocal laser-scanning microscopes and autofluorescent proteins such as the jellyfish green fluorescent protein (GFP), have paved the way for following specific molecules in living cells. Furthermore, it is now possible to detect protein-protein interactions at the subcellular level using fluorescence resonance energy transfer–a great leap in our efforts to understand how molecular machines work. In the plenary talk of the meeting, Roger Tsien will describe how fluorescence microscopy can be used in ingenious ways to unravel the secrets of the cell.

There will also be a minisymposium on "Biosensors" (Chair: Mark Philips), which will feature some of the latest tools to study molecular processes in situ. A minisymposium on "Organelle Visualization" (Chair: Jennifer Lippincott-Schwartz) will zoom out to investigate the dynamic relationship between various cytoplasmic organelles using fluorescently tagged proteins. The functional subcompartmentalization of the nucleus will be investigated in a minisymposium on "Sub-nuclear Organization" (Chair: Maria Carmo-Fonseca). And how are proteins and lipids transported between different organelles? This will be discussed in a minisymposium on "Vesicular Trafficking" (Chair: Harald Stenmark).

Finally, two dramatic examples of changes in cellular dynamics, those of cell division and programmed cell death, will be highlighted in minisymposia on "Meiosis/mitosis" (Chair: Erich Nigg) and "Apoptosis" (Chair: Suzanne Cory), respectively. We are happy that top scientists in their respective fields have accepted to speak at this meeting, which should be of interest for anyone who wants to understand more about the organization and molecular/organellar dynamics of the cell, and for those who need the tools to learn even more.



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The Norwegian Radium Hospital

PLENARY LECTURE:

Unlocking cell secrets with photons and molecular spies
Roger Y. Tsien, *HHMI, UCSD*

Biosensors

Visualization of Ras signaling
Chair, Mark R. Philips, *New York Univ. Sch. of Med.*

Visualizing calcium signaling
Tullio Pozzan, *Univ. of Padova, Italy*

Local and global reactions in chemotactic gradient sensing
Peter Devreotes, *Johns Hopkins Univ. Sch. of Med.*

Vesicular Trafficking

Endocytosis in receptor down regulation
Chair, Harald A. Stenmark, *Norwegian Radium Hosp., Oslo*

Signal-mediated protein sorting in the endosomal-lysosomal system
Juan S. Bonifacino, *NICHHD, NIH*

Phosphoinositides and membrane traffic in neurons
Pietro De Camilli, *HHMI, Yale Univ. Sch. of Med.*

Meiosis/Mitosis

The centrosome cycle, chromosome segregation and cell division
Chair, Erich A. Nigg, Max Planck Inst. of Biochemistry

Regulation of the microtubule cytoskeleton
Yixian Zheng, *HHMI Carnegie Inst. of Washington*

The role of the synaptonemal complex during male and female meiosis
Christer Höög, *Karolinska Inst., Stockholm, Sweden*

Organelle Visualization

Transport through the Golgi apparatus
Chair, Jennifer Lippincott-Schwartz, *NICHHD, NIH*

Characterization of the steps in vesicle-membrane fusion
Gary Banker, *Oregon Health Science Center*

Membrane trafficking and neuronal polarity
Sanford Simon, *Rockefeller Univ.*

Apoptosis

Making life and death decisions for cells
Chair, Suzanne Cory, *The Walter and Eliza Hall Inst. of Med. Res., Melbourne, Australia*

The Bcl-2 family and mitochondrial membrane permeability in apoptosis
Don Newmeyer, *La Jolla Inst. for Allergy and Immunology*

Physiological role of apoptotic DNA degradation
Shigekazu Nagata, *Osaka Univ. Med. Sch., Japan*

Sub-Nuclear Organization

The biogenesis of messenger RNA in the nucleus
Chair, Maria Carmo-Fonseca, *Instituto de Medicina Moleular, Lisboa, Portugal*

The cell biology of genomes
Tom Misteli, *NCI, NIH*

Silencing to gene expression: real-time analysis in living cells
***David Spector**, Cold Spring Harbor Lab*

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Abstract Deadline: February 4, 2004

Integration of Signaling Mechanisms

Organizer: Kjetil Taskén, *Professor and Director, the Biotechnology Centre of Oslo. University of Oslo, Norway*

Of the more than 30,000 genes in the human genome, over 20% of encode proteins involved in cellular signaling at various levels. The large fraction of the genome devoted to cellular signaling illustrates the fundamental importance of these processes. Likewise, signaling molecules are often perturbed in disease and are major targets for drug developments. The overview of signaling molecules provided by completion of a number of genomes combined with a toolbox of new techniques in proteomics and functional genomics that can address interactions and substrates, now leads to an exponential growth in understanding of signaling and is taking the field from focus on linear pathways to understanding complex and integrated intracellular signaling networks which will be highlighted in this meeting.

Signal Integration

Control of Cell Death Pathways in Mammary Epithelial Cells

Chair Joan Brugge, *Harvard Medical School*

This symposium will focus on how integration of signals from a number of pathways converge upon down-stream effectors and cell functions such as control of cell death pathways by various signal inputs. Dr. Treisman will discuss the signal networks that come together and regulate gene expression and Dr. Bos will discuss signal pathways that involve small G proteins regulating cellular adhesion.

Signal convergence at the serum response element

Richard Treisman, *Cancer Research UK London Research Institute*

Signalling by Ras-like small GTPases and integrin-mediated cell adhesion

Johannes Bos, *University Medical Center Utrecht*

Spatiotemporal Organization of Signaling Events

A concept that has developed over a little more than a decade is the compartmentalization of signalling pathways via anchoring and scaffolding proteins and docking and adaptor molecules, the observation that local pools of diffusible messengers are sufficient for signaling and the idea that many down-stream substrates appear to have their own, private anchored pool of signalling enzymes and effectors. Chair of this symposium will be Dr. Taskén who will discuss specific signalling pathways that are localized to lipid rafts and how the timing of signalling events proceeds in these membrane microdomains. Dr. Scott will discuss developments in the field of anchoring and scaffolding proteins that assemble signal effectors together with signal terminators of different signaling pathways into multiprotein signaling complexes that serve as crossroads on the highways of cell signaling. Dr. Veillette will go into the world of signaling by docking and adaptors that provide spatiotemporal organization of signaling events.

The Molecular Archetecture of Signal Transduction complexes

John Scott, *HHMI and Vollum Institute*

Signaling by adaptor molecules in immune cells

André Veillette, *Laboratory of Molecular Oncology, Montreal*

Genetic and Molecular Resolution of Signaling

Structural basis for regulation of protein phosphatases and protein kinases

Chair, David Barford, *Institute of Cancer Research, London*

Molecular resolution of structures of kinases and phosphatases has been instrumental in understanding function. The increasing through-put of new structures resolved provides basis for structural comparisons across genomes and across classes of molecules and this opens up for structure-based drug design on large classes of enzymes. Similarly high-throughput techniques for analysis of protein-protein interactions and genetic resolution of signaling pathways makes it feasible to progress into building of signal networks. Dr. Pawson will discuss how modular protein interaction domains that interact with other proteins, phospholipids, nucleic acids and small molecules contribute to building of regulatory systems such as protein complexes and signal networks. Dr. Emr will discuss mapping of phosphoinositide signal pathways by genetic systems.

Assembly of cell regulatory systems through protein interactions

Tony Pawson, *Mt. Sinai Hospital, Toronto*

Phosphoinositide kinase signaling in membrane trafficking and receptor down-regulation

Scott Emr, *UCSD, San Diego*

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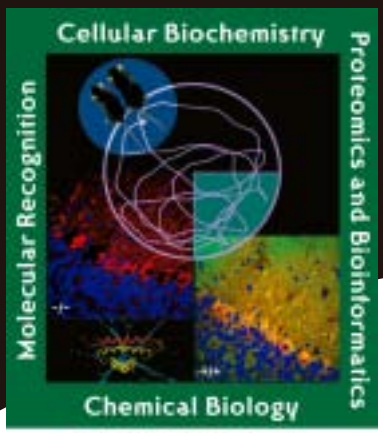

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Signal Integration

Control of cell death pathways in mammary epithelial cells
Chair, Joan Brugge, *Harvard Med. Sch.*

Signal convergence at the serum response element
Richard Treisman, *Cancer Res. UK London Res. Inst.*

Signaling by Ras-like small GTPases and integrin-mediated cell adhesion
Johannes L. Bos, *Univ. Med. Ctr.–Utrecht, The Netherlands*

Informatics and Modeling of Signaling Pathways

Signaling through tyrosine phosphorylation
Chair, Tony Hunter, *Salk Inst.*

Cue-Signal-Response analysis of cell decision processes
Douglas A. Lauffenburger, *MIT*

Modeling MAPK-cascades – robustness and feedback loops
Hanspeter Herzel, *Humboldt Univ., Berlin*

Spatiotemporal Organization of Signaling Events

cAMP signal pathways in membrane microdomains regulate Src kinase signaling
Chair, Kjetil Taskén, *Univ. of Oslo, Norway*

The molecular architecture of signal transduction complexes
John Scott, *HHMI, Vollum Inst.*

Signaling by adaptor molecules in immune cells
André Veillette, *IRCM, Montreal*

Genetic and Molecular Resolution of Signaling

Structural basis for regulation of protein phosphatases and protein kinases
Chair, David Barford, *Inst. of Cancer Res., London*

Assembly of cell regulatory systems through protein interactions
Tony Pawson, *Samuel Lunenfeld Res. Inst., Mt. Sinai Hosp.*

Phosphoinositide kinase signaling in membrane trafficking and receptor down-regulation
Scott D. Emr, *HHMI, UCSD*

Signal Termination

Termination of Protein Kinase C signaling
Chair, Alexandra Newton, *UCSD*

Scaffold interactions involving arrestin, ERK, RACK1, AKAPs and XAP2 confer compartmentalized regulation of cAMP signaling by distinct PDE4 phosphodiesterase isoforms
Miles Houslay, *Univ. of Glasgow, UK*

Signal termination by protein phosphatase-1
Mathieu Bollen, *Katholieke Univ. Leuven, Belgium*

Mechanisms of Cytoskeletal Signaling

Signals that regulate epithelial mesenchymal transition and invasion
Chair, Morag Park, *McGill University Health Centre, Royal Victoria Hospital, Montreal*

Regulation of cell and neuronal growth cone motility
Frank Gertler, *MIT*

The logic of modular signaling proteins
Wendell A. Lim, *UCSF*

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Lasker Award Honors Rockefeller University Biochemist for Pioneering Studies of Gene Activation

Robert G. Roeder, Professor and Chair of the Laboratory of Biochemistry and Molecular Biology at Rockefeller University and a biochemist whose research has led to major advances in understanding how human genes are switched on and off, is this year's recipient of the prestigious Albert Lasker Award for Basic Medical Research.

Dr. Roeder, an ASBMB member who shared the 2002 ASBMB-Merck Award for outstanding contributions to research in biochemistry and molecular biology with Stanford University's Dr. Roger D. Kornberg, says, "We need to understand not only the mechanisms underlying normal gene activation, but to relate these to important medical problems. As we become familiar with the fundamentals of how genes work, we get closer to understanding diseases like cancer or viral infections such as HIV."

For the last 30 years, Dr. Roeder's research has provided more than the beginnings of an answer to the question of how cells control or regulate transcription, and how this process breaks down in certain diseases, such as cancer. In addition to outlining virtually all of what we know today about the basic principles of transcription and its regulation by proteins in animal cells, he and his colleagues have created the model from which scientists throughout the world continue to study this basic mechanism of life.

His research includes: discovery of the enzymes— RNA polymerases—that directly read out and copy the messages encoded in DNA; identification of these enzymes' associated helper factors, the general transcription machinery; and definition of the first of many hundreds of DNA-binding regulatory proteins, called activators and repressors, that control the rate of gene transcription.

Lasker Prize winner Robert Roeder

Over the last decade at Rockefeller University, Dr. Roeder and his colleagues have identified several coactivators, thereby ushering in a modern age in biology. He says, "We have uncovered a third layer of complexity in the transcription process." His laboratory demonstrated that coactivators can be both ubiquitous, monitoring many genes in a variety of cells, or specific to one particular cell type. This latter concept of cell-specificity was first introduced by Dr. Roeder and his colleagues after they demonstrated that the coactivator OCA-B, first isolated in his laboratory, was unique to B cells, a type of immune system cell that makes antibodies.

"What began to emerge," says Dr. Roeder, "is that these coactivators, like the RNA polymerases, are incredibly complicated machines."

His pioneering work in transcription began while he was a graduate student in the laboratory of Dr. William J. Rutter, also an ASBMB member, at the University of Washington in the late 1960s. While working on his own independent project, Dr. Roeder identified in animal cells three different RNA polymerases, as well as specific locations within the cell's nucleus that provided an early indication of the polymerases' distinct functions.

In subsequent research at Washington University School of Medicine, he showed that these three enzymes recognize and read the messages encoded in distinct classes of genes in eukaryotes, organisms whose cells contain DNA in a nucleus: RNA polymerase I converts or transcribes DNA into ribosomal RNA (rRNA); RNA polymerase II transcribes DNA into messenger RNA (mRNA); and RNA polymerase III transcribes DNA into transfer RNA (tRNA). Both rRNA and tRNA aid in the production of proteins, while mRNA itself provides the recipe for a new protein.

This last discovery was particularly remarkable considering that, at the time, the tools of molecular biology had yet to be invented.

In the late 1970s, Dr. Roeder developed cell-free systems that allowed him and others to study the function of individual genes and transcription-related proteins outside of living cells, in effect recreating transcription in a test tube in a way that faithfully mimics the real process in cells. Using this powerful test-tube technique, composed of purified RNA polymerases and components extracted from cell nuclei, he identified distinct sets of proteins essential for the individual RNA polymerases to recognize start sites on specific target genes.

He simultaneously identified the first gene-specific activator, TFIIIA, in eukaryotes. TFIIIA and similar proteins bind to specific DNA sequences and enhance the "reading" of corresponding target genes by the appropriate subset of the general transcription machinery. Repressors perform the opposite task by inhibiting a gene's activity.

Hundreds of these transcription activators and repressors have subse-

quently been identified, and many more are expected for the regulation of genes during such physiological processes as cell growth and division, hormonal processes, virus infection, and tumor growth.

"The challenge we now face is understanding the differential regulation of about 30,000 human genes," says Dr. Roeder.

Current Projects

Between 1991 and 1996, Dr. Roeder's lab discovered the major conduit for communication between gene-specific activators and the general transcription machinery in animal cells: the researchers elaborated the biochemical details of a giant coactivator (TRAP/SMCC) consisting of about 25 different protein chains and referred to as the "the human Mediator" after its counterpart in yeast.

Currently, the Roeder laboratory is homing in on precisely how this massive protein complex regulates transcription. Many of their projects look at the interaction between it and specific activators such as nuclear hormone receptors, proteins involved in development and homeostasis, and p53, a protein implicated in at least 60 percent of human cancers. The researchers previously revealed that thyroid hormone receptor and p53, which both are known to activate several genes as part of their normal cellular activity, require separate components of the human Mediator to properly function.

"More precise knowledge of coactivators could offer the potential to design more specific drugs with fewer side effects," says Dr. Roeder.

Nobel Prize continued ...

Continued from page 9

channel protein in pure form and figured out how to use it to make well-ordered crystals, a prerequisite for determining a molecule's structure.

After bombarding the crystals with x-rays, Dr. MacKinnon and his colleagues were able to deduce that the potassium channel is made up of four identical subunits assembled in the shape of an inverted teepee. They found that the wide end of the teepee contains the signature-sequence amino acids, which are arranged to form a tunnel into which an ion must fit precisely in order to enter a cell. If an ion is too large, it cannot fit into the tunnel; if it is too small, it does not enter the tunnel because it cannot align correctly to the tunnel's sides.

However, he and his co-workers did not stop with the bacterial ion channel: They also conducted experiments that showed that the fly Shaker channel is similarly shaped. The researchers determined that an exquisitely specific toxin isolated from scorpion venom binds to the fly Shaker channel and mammalian potassium channels just as tightly as it does to the bacterial potassium channel. Because scorpion toxins are known to fit the channels they block exactly, like a lock and key, this suggests that the bacterial, mammalian and fly channels share the same structure. "It's as if nature settled on one way to make a potassium channel," he says.

The potassium channel is only one of a dozen or so proteins that span the cell membrane whose three-dimensional structures have been solved, primarily because it is difficult to amass enough of a given transmembrane protein to make crystals large enough to study.

Dr. MacKinnon hopes that the bacterial potassium channels will be useful for screening potential new drugs. Two human potassium channels have immediate medical importance: KATP, which is located in the beta cells of the pancreas that secrete insulin, and HERG, which helps the ventricles of the heart recharge so they can contract again. HHMI Investigator Dr. Mark Keating of Children's Hospital in Boston has linked mutations in HERG with a disorder called long QT syndrome that can lead to deadly heart arhythmias. Drugs that regulate the activity of these channels might be useful as treatments for diabetes and in preventing sudden death from long QT syndrome. But many more potassium channels are likely to become targets for drug development in the near future. Diseases such as hypertension and epilepsy, for example, should be treatable through pharmacological control of potassium channel functioning.

"It's as if nature settled on one way to make a potassium channel."

Dr. Roderick MacKinnon

Harvard's Jack Strominger Named

Jack L. Strominger, Higgins Professor of Biochemistry in the Department of Molecular and Cellular Biology, Harvard University, will be the 2004 recipient of the ASBMB-Merck Award. This Award recognizes outstanding contributions to research in biochemistry and molecular biology. Recipients over the past five years have been Stephen Benkovic in 2003, Robert G. Roeder and Robert D. Kornberger who shared the Award in 2002, Avram Hershko and Alexander J. Varshavsky who shared the Award in 2001, Robert L. Baldwin in 2000, and Alexander Rich in 1999. The Award consists of a stipend, plaque, and transportation and expenses of the recipient and spouse to the 2004 Annual Meeting, at which Dr. Strominger will present a lecture.

In nominating him for this Award, Alexander Rich, William Thompson Sedgwick Professor of Biophysics, Department of Biology, Massachusetts Institute of Technology, cited Dr. Strominger's pioneering contributions to our understanding of the biochemical basis of molecular recognition in infection and immunity. During his career he made seminal contributions in two different fields.

"In his early career (1960-1980)," wrote Dr. Rich, "he elucidated the chemical structure of bacterial cell walls and the mechanism of recognition of penicillin by bacterial enzymes. This field is now having a renaissance based on his early work. The bacterial cell wall components that he identified (and many of whose structures he elucidated) are now under investigation as the ligands for the Toll- like receptors on dendritic cells, the primary responders in the early innate immune system response. He discovered around 30 specific enzymes required for the biosynthesis of bacterial cell walls. As the result of emergence of drug resistant bacteria, many of these are now under investigation as possible targets for new chemotherapeutic agents. He showed that the last steps are catalyzed by a set of bifunctional transglycosylase/transpeptidases, the penicillin binding proteins that are inactivated by penicilloylation resulting from enzymatic cleavage of the β-lactam ring. His remarkable 1965 and 1980 publications on the penicillin mechanism were shown this past year to be correct in even their most detailed hypotheses."

Over the past 30 years, Dr. Strominger pioneered in the discovery of the structures of both class I and class II human major histocompatibility complex antigens and their recognition of self and foreign peptides for presentation to the immune system. In two truly groundbreaking papers, both published in the *Journal of Biological Chemistry*, he reported the isolation of two classes of histocompatibility protein, and showed that they were closely related structurally, differing in the linkage of their four domains. They are the Class I and Class II MHC proteins (MHC I and MHC II). Only a single class had been known previously. In each case the separation of closely related isotypes was accomplished and several MHC I and MHC II proteins were crystallized.

Dr. Strominger also initiated a collaboration with his Harvard colleague, the late Dr. Don Wiley, that resulted in the elucidation of the three-dimensional structures of both classes of MHC proteins and their bound peptides. He recently also showed that the recognition of the class I MHC protein, III A-C, has a different function. It is the dominant inhibitory ligand whose recognition regulates the activity of human natural killer cells.

Dr. Jack Strominger

Most recently, the ASBMB-Merck awardee has focused on the application of the knowledge gained to the study of human autoimmune diseases, as illustrated by many recent papers. One of these has the potential for developing an important new therapy for multiple sclerosis. In this work he utilized the biochemical and structural information derived from his studies of MHC II to design an important new copolymer for therapy of this disease.

First he realized that a random amino acid copolymer now used for therapy (but with limited effectiveness), Copaxone, had been developed without reference to the structure of HLA-DR2, the MHC II allele with which this disease is associated. He then redesigned the copolymer to obtain one that binds many fold better to HLA- DR2 and showed that the new copolymer was far more effective than Copaxone in the treatment of experimental autoimmune encephalomyelitis, the mouse model of the human disease. The new copolymer is now under development for clinical trial in the human disease. It is an elegant example of the application of biochemistry to human therapeutics.

to Receive ASBMB-Merck Award

In each of the two fields in which he worked, Dr. Strominger opened up an entirely new area of research of great importance. A brief examination of the number of investigators now working in these two fields and the number of published papers demonstrates the impact of his work. In the case of histocompatibility proteins, an impressively large number of his students and postdoctoral fellows have gone on to make independent seminal contributions to various aspects of this field and to hold distinguished professorships.

"No other biochemist has pioneered more broadly in our science" said Dr. Rich. "His early discoveries are a milestone in microbiology. The later discoveries are arguably the most important contribution to the molecular basis of immune recognition in the past few decades."

Said Herbert Tabor, Editor of the *Journal of Biological Chemistry,* "I would like to enthusiastically support the nomination of Dr. Strominger for the ASBMB-Merck Award. I have followed his work closely since we first worked in the same laboratory at NIH about 50 years ago. At that time he started his monumental studies on the structure of bacterial cell walls, starting with a study of the mechanism of penicillin action.

"About 30 years ago he completely changed his interests and carried out critical experiments on the structures of the human major histocompatibility antigens and their role in the immune system. He carried out a large number of critical investigations in this field, including, with Dr. Wiley, the crystallization and three-dimensional study of several MHCI and MHCII proteins. He clearly is one of the most productive and imaginative investigators in the fields of biochemistry and immunology."

$85 Million Awarded for Research on

A better understanding of the human immune response to potential agents of bioterror and rapid development of countermeasures such as vaccines and therapies are among the objectives of a new National Institute of Allergy and Infectious Diseases (NIAID) program.

NIAID has named five Cooperative Centers for Translational Research on Human Immunology and Biodefense. Approximately $85 million over four-and-a-half years will support research at Baylor Research Institute, Dallas; Dana-Farber Cancer Institute, Boston; Emory University School of Medicine, Atlanta; Stanford University School of Medicine; and University of Massachusetts Medical School, Worcester.

"A particular emphasis of these cooperative centers will be moving new findings about immune system function out of the lab and into clinical trials," said NIAID Director Anthony S. Fauci. "The flexibility of the program will allow research projects to be redirected quickly as new information is generated in the lab and the clinic."

NIGMS to Fund Stem Cell Exploration

To elucidate the basic biology of stem cells, the National Institute of General Medical Sciences (NIGMS) is funding three Exploratory Centers for Human Embryonic Stem Cell Research. NIGMS is awarding $2.2 million for the first year of funding for the three 3-year awards, which over their lifetime are expected to total more than $6.3 million.

A key goal is to train basic scientists to learn how to work with the finicky cells. According to NIGMS, many researchers have had a difficult time getting stem cells to thrive in an undifferentiated state in the laboratory. The shortage of scientists with expertise in stem cell research and the lack of molecular tools to study stem cells are currently limiting advances in the progress of embryonic stem cell research.

"NIGMS recognizes a critical need to increase the scientific workforce in this important area of 21st century biomedical research," said Judith H. Greenberg, Ph.D., Acting Director of NIGMS. "We also want to help the research community overcome some of the technological barriers that have prevented biologists from developing stem cells into a powerful model system for probing health and disease."

The new awards are:

University of Washington, Fred Hutchinson Cancer Research Center: $753,000 for the first year of funding to improve methods to culture, maintain, manipulate, differentiate and compare the 12 federally approved human embryonic stem cell lines. The group will also seek to identify the molecular signals that enable stem cells to self-renew, evaluate methods for genetically modifying stem cells, and study how stem cells choose to become specialized cell types such as neurons and heart cells.

University of Michigan Medical School in Ann Arbor: $778,000 for the first year of funding to apply knowledge and expertise in cell biology, developmental genetics and tissue biology to the study of human embryonic stem cells. The group will establish a core laboratory for maintaining and distributing human embryonic stem cells to the University of Michigan scientific community, develop research tools to study stem cells, and support education and training on the use of the cells.

WiCell Research Institute in Madison, Wisconsin: $669,000 for the first year of funding to create a central core facility to provide cell tissue culture support, including media preparation, quality control and routine chromosomal analysis of cultured stem cells. The group will examine in detail how stem cells make the transition from primitive cells to becoming neurons, and study how certain signals cause stem cells to lose their ability to self-renew, as well as how molecules produced by "feeder cells" support the self-renewal process.

Human Immunity and Biodefense

Investigators funded through the new program will form a biodefense research network with a focus on the human immune system.

The absence of necessary technologies is a significant barrier in human immune function research, according to Dr. Helen Quill, of NIAID's Division of Allergy, Immunology and Transplantation (DAIT). To overcome this obstacle, researchers at the cooperative centers will, among other measures, develop new ways to get information from single immune cells, so that very small tissue and blood samples can be tested. Imaging technologies will also be developed to allow non-invasive, real-time views of the body as it reacts to vaccine or infection, Dr. Quill notes. The improved techniques could help researchers determine the immune mechanisms responsible for strong versus weak vaccine responses. The information will be useful in developing novel vaccines.

"One of the key features of these new centers will be the high degree of information-sharing by all the members," noted Daniel Rotrosen, Director of DAIT. "Ultimately, we hope to fully characterize human immune responses to disease-causing organisms and develop therapies that strengthen these responses, whether the organisms are deliberately released or arise naturally in the environment. The cooperative centers will encourage the kind of synergy needed to meet this goal."

by John D. Thompson, Editor

Is Biotechnology Coming to

Will Fairfax County in Northern Virginia become a Mecca for biotechnology business? "Location, location, location" has long been the guiding star for retailers, and it could well prove to be the key to further boosting the economy for Fairfax and Northern Virginia as a whole.

As the Fairfax County Economic Development Authority sees it, when you look at a map of the Atlantic Coast states, Northern Virginia is a biotechless gap in the Middle Atlantic. To the north, there are concentrations of biotech business and research centers in the Boston, New York, Philadelphia, Wilmington, and Baltimore/Washington areas, and then nothing much all the way down to Research Triangle in North Carolina.

In Northern Virginia, on the other hand, there is a gap. However, county officials do not see it is a gap in terms of the infrastructure—research and education institutions, a highly educated workforce, plenty of available land, close proximity to the federal government and its potential as a source for business and research grants, and a location at the center of a worldwide communications and transportation hub. According to the Fairfax County Economic Development Authority (FCEDA), which serves not just the county but all of Northern Virginia, the gap is not a gap but an abundant field of opportunity to be harvested.

Fairfax County EDA officials do not see a gap in infrastructure. They note that Fairfax is home to research and educational institutions, a highly educated workforce, plenty of available land, is next door to the federal government and its business and research grants, and is a worldwide communications and transportation hub. The county's transformation as a business and technology center can be seen through a few statistics: The county is home to 4,800 technology companies, has been responsible for 40 percent of the job growth in the Washington, D.C., area for the last five years, and county residents alone account for 24% of the income tax collected in Virginia annually. However, now the county hopes to capitalize on the growing application of information technology to biotechnology and biomedical processes. The opportunities are enhanced by a large and growing array of bioscience resources in northern Virginia and the immediate area.

The Howard Hughes Medical Institute, one of the world's top privately-owned biomedical research centers, is building a $500 million campus at Janelia Farm just minutes away from Fairfax County; Johns Hopkins University receives more federal research-and-development dollars than any other university in the nation; and NIH, NSF, and FDA are among the dozens of federal research institutions and regulatory agencies in the Washington, DC area.

The new Fairfax County BioAccelerator, which opened in 2002 as an incubator for bioscience business serves as a focal point and catalyst for growth in the life-science area. Its 7,500 square foot complex is located near the Northern Virginia Community College Medical Education campus the will open this fall.

George Mason University (GMU) has three bioscience institutes to help educate the biotech workforce of the future: the Krasnow Institute, Center for Bioresource Development, and School of Computational Sciences.

GMU's National Center for Biodefense will be leading counter-terrorism research with partners from private industry.

Inova Fairfax Hospital, a tertiary-care center, has been designated a Top 100 National Benchmark Hospital.

The American Type Culture Collection is the nation's main repository of cell lines for life-science research and business.

Ely Lilly plans a $425 million, 600,000 square foot insulation manufacturing plant in Northern Virginia.

MITRE, a federally funded and research and development company, is a member of the International Consortium for Brain Mapping.

Industry organizations encouraging the development of Northern Virginia as center of bioscience business include the Virginia Biotechnology Association, Bio IT Coalition, and the BioMedTech Committee of the Northern Virginia Technology Council.

Virginia Commonwealth University's Medical College of Virginia has established a program with Inova Health Systems to train third- and fourth-year medical students at Inova Fairfax Hospital. The 50 residents in healthcare/medicine at Inova Fairfax now, will be 100 a year come 2005.

Chantilly Academy, a Fairfax County high school, has launched a bioinformatics course.

High-end research in biotechnology is just one of the reasons why Fairfax's Thomas Jefferson High School has been the top school in the National Merit Scholarship program for 11 of the last 12 years.

Among biotechnology and bioinformation firms that have found opportu-

Virginia's Fairfax County?

Gerald L. Gordon, President and CEO of the Fairfax County Economic Development Authority, says "We see the biosciences as one of the building blocks to an even more diversified and stable economy for Fairfax County. We know that building that sector will be take time, but this is a great location for biotech companies looking to exploit an IT infrastructure, a highly educated workforce, and federal government resources."

nity in Northern Virginia are Healthtechnomics, Inc., a developer of computer-based health education materials for such federal agencies as NIH; Digital Reasoning which has developed analytical software that allows healthcare practitioners to share realtime drug interaction and toxicity data with pharmaceutical firms and use the resulting data for clinical trials; HealthRx.com which provides software products and research tools to the healthcare and life sciences community, SmartBead Technologies, a developer of multiplexed assays and technologies for drug development and diagnostics; and ElCare Innovations, a medical device and development company that focuses on emergency rescue devices.

Information Management Consultants (IMC), a company headed by Northern Virginia Technology Chair and FCEDA Commissioner Sudhakar Shenoy, which developed a new bioinformatics application for the Salk Institute. Salk Neurologist Carrolee Barlow and her team, were working on a gene expression atlas for the mouse brain when they were confronted with the problem of too much data to store and analyze. With IMC's assistance the solution was found in Teradata, a data warehouse platform common to banking and retail but new to life sciences. Now, the resulting database is in production and IMC is busily building similar data warehouses for customers overwhelmed with gene expression data.

Other major Northern Virginia firms in the biotech and bioinformatics area are American Medical Labs, Biotraces, Cel-Sci, Covance Laboratories, FOCUS/MRL, and Quintiles.

Companies such as these benefit from Fairfax County and the adjoining area's highly educated and growing workforce. Over 30% of Fairfax residents hold a master's or professional level degree, and almost 60% have a bachelor's degree compared to just 25% of the total U.S. workforce. This is hardly surprising; the county is a national leader in education and Fairfax students consistently rank well above the national average in SAT scores.

The three major universities and community college whose campuses are located in, or immediately adjacent to, Fairfax County have equally impressive credits, and not only provide a technically-attuned pool of potential employees but also serve as a valuable resource for needed research.

George Mason University (GMU) is home to the first engineering school in the nation to focus on information technology—the School of Information Technology and Engineering. The university's 24,000 students can choose from over 100 programs leading to bachelors, masters, or doctoral degrees. GMU's Mason enterprise Center, part of the Northern Virginia Small Business Development Center, offers consulting and training services to help entrepreneurs throughout the Washington, DC, area start or grow their businesses.

The University of Virginia and Virginia Polytechnic Institute (Virginia Tech) share a 105,000-square-foot facility in Falls Church and offer undergraduate and graduate programs in a wide range of disciplines. Also in the immediate area is the University of Virginia's Darden School of Business and Old Dominion University, which operates an interactive distance learning program from its Annandale campus.

A major factor in providing an educated and skilled workforce is Northern Virginia Community College (NVCC), which serves over 60,000 students in credit courses and more than 300,000 in non-credit courses and this fall is opening, in Springfield, its sixth campus. In 2001, *Community College Week* named NVCC as one of the top-ranked community colleges in the number of associate degrees conferred in business management, administrative services, and healthcare professions. Those two-year graduates of NVCC who specialized in biotechnology or bioinformatics, but opted not to go on to a four-year college, represent a great resource for incoming biotech companies, particularly in data mining.

Affordable Real Estate

A particular attraction in this era of soaring prices, is ample office space—some 100 million square feet—and highly competitive leasing. At the end of 2001, the average rate for a square foot of office space in Fairfax County was $28.20 per year, compared to $47.33 in San Jose/Silicon Valley, $40.06 in Boston, and $32.49 in San Diego.

Integration of Signaling Mechanisms continued ...

Continued from page 18

Informatics and Modeling of Signaling Pathways

Signaling through tyrosine phosphorylation

Chair Tony Hunter, *Salk Institute*

Handling and combination of large experimental data sets and the use of bioinformatics and biostatistics in systems biology has facilitated that we can begin to understand the complexity of integrated signal inputs, build models and gain an integrated understanding that go well beyond the summarization of the input data. Whereas Dr. Hunter will address signaling networks that involve tyrosine phosphorylation, Dr. Lauffenburger will talk about analysis of cell decision processes and Dr. Herzel will share with us the modeling of stress-signaling pathways.

Cue-Signal-Response Analysis of Cell Decision Processes

Doug Lauffenburger, Massachusetts Institute of Technology, Cambridge

Modeling MAPK-Cascades – Robustness and Feedback Loops

Hanspeter Herzel, Humboldt University, Berlin

Signal Termination

Termination of Protein Kinase C Signalling

Chair Alexandra Newton, *UCSD, San Diego*

Equally important as signal initiation, is signal modulation and termination by the molecular machinery that limits specific signals both in duration and extension. The speakers in this session will address signal termination of protein kinase C signaling, of cAMP signaling by phosphodiesterases and of protein phosphorylation by specific phosphatases.

Scaffold interactions involving barrestin, ERK, RACK1, AKAPs and XAP2 confer compartmentalized regulation of cAMP signalling by distinct PDE4 phosphodiesterase isoforms

Miles Houslay, *University of Glasgow*

Signal termination by protein phosphatase-1

Mathieu Bollen, *Katholieke Univ. Leuven*

Mechanisms of Cytoskeletal Signaling

Signals that regulate epithelial mesenchymal transition and invasion

Chair Morag Park, *McGill University Health Centre, Montreal*

Cytoskeleton encompasses numerous dynamic structures that constantly are being remodeled and reshaped. Furthermore, cytoskeleton is subject to regulation by signal inputs as well as being an integral part of a number of cell signaling pathways. Dr. Morag will discuss synergistic action of signaling pathways in regulation of invasion and morphogenesis whereas Dr. Gertler will go into how signal regulation of cytoskeletal dynamics and remodeling of actin is required to coordinate cell movement, adhesion and shape change. Dr. Lim will show how cytoskeletal regulatory proteins composed of modular domains may confer multi-input signal integration and participate in complex cellular circuits.

Regulation of Cell and Neuronal Growth Cone Motility

Frank Gertler, *Massachusetts Institute of Technology, Cambridge*

The Logic of Modular Signaling Proteins

Wendell A. Lim, *UCSF, San Francisco*

Career Opportunities

EXECUTIVE OFFICER
American Society for Biochemistry and Molecular Biology (ASBMB)

A Member Society of the Federation of American Societies for Experimental Biology (FASEB)

The ASBMB is a leading international scientific society representing over 11,000 research scientists, academicians and scientists in training. The ASBMB seeks an Executive Officer due to the imminent retirement of Charles C. Hancock, Jr., following 24 years of outstanding service.

The mission of the ASBMB is to promote understanding of the molecular nature of life processes. This mission is accomplished through:

- publication of the *Journal of Biological Chemistry*, *Molecular & Cellular Proteomics*, *Journal of Lipid Research*, *Biochemistry and Molecular Biology Education* and its magazine, *ASBMB Today*.
- organization of an annual scientific meeting and specialized meetings.
- science advocacy and communication with public and private agencies.
- support of scientific education and training at all levels and promoting diversity.

The Executive Officer is responsible for the management of business affairs and implementation of actions initiated by ASBMB Council. Responsibilities include coordination of Council and other ASBMB meetings, elections, interactions with FASEB and other professional societies, congressional committees, scientific meeting coordination, budgetary and regulatory aspects of publication and contract negotiations. Offices of the ASBMB are located on the FASEB Campus in Bethesda, Maryland. The Executive Officer directs a staff of approximately twenty full-time employees resident in the ASBMB Offices. Frequent travel to scientific and society-related meetings is expected.

Qualified applicants should have excellent communication, interpersonal and administrative skills with a record of achievement and leadership in management of academic, association or other non-profit organizations. Experience in communication with leaders in the scientific, philanthropic and publishing communities is desirable. Applicants should provide a résumé, the names of three or more references and a cover letter indicating their strengths for this position. Applications will be reviewed beginning November 1, 2003. Applications provided as electronic attachments are preferred. Please email application materials to: maureen@hr.faseb.org and mail materials to: ASBMB Executive Officer Search, Human Resources, Federation of American Societies for Experimental Biology, 9650 Rockville Pike, Bethesda, Maryland 20814-3998.

ASBMB is an Equal Opportunity Employer.

POST-DOCTORAL RESEARCH FELLOW (Job $4096)

A position is available at the Puget Sound Blood Center in Seattle, WA to study megkaryocyte development and thrombopoiesis. Project will focus on signal transduction in hematopoietic cells and genetic studies of inherited platelet disorders. Candidates must have a Ph.D. or M.D. degree, a background in hematopoiesis, genetics, or signal transduction, and a valid Visa permitting work in the United States. Experience with tissue culture, molecular biology techniques, and protein analysis is desirable. Salary is in accordance with NIH post-doctoral pay scale. Qualified applicants should send their curriculum vitae and the names of three references to: Human Resources, Puget Sound Blood Center, 921 Terry Avenue, Seattle, WA 98104-1256, or email to HumanResources@psbc.org.

JOHN W. HEIN POSTDOCTORAL RESEARCH FELLOWSHIP AWARD
The Forsyth Institute

The Forsyth Institute is a private, Harvard affiliate, world-renowned for scientific excellence in oral disease and developmental biology. We invite applicants for the John W. Hein Research Fellowship. The fellowship provides generous salary compensation, benefits, and infrastructure to develop a research program mentored by a Forsyth researcher. Support will be for 2 years with the possibility of an additional year. Applicants should have a Ph.D., MD, or DDS degree, and be US citizens, permanent residents, or holders of J1 or H1 visas with the view to obtaining US residency. Candidates who develop innovative and productive research programs have the potential to become Forsyth faculty members. Applicants should visit the Forsyth web site (http://www.forsyth.org) for information regarding research activities, and to identify a potential mentor(s). A cover letter indicating research interest and mentor, together with a CV that includes contact information for 3 referees should be sent to Dr. Margaret Duncan, Chairman, JWH Committee, The Forsyth Institute, 140 Fenway, Boston, MA 02115. Affirmative Action/Equal Opportunity Employer.

Calendar of Scientific Meetings

NOVEMBER 2003

Biomedical Information Science and Technology Initiative (BISTI) 2003 Symposium Digital Biology: The Emerging Paradigm

November 6–7 • Natcher Conference Center, NIH, Bethesda, MD
Contact: Saundra Bromberg, Capital Consulting Corporation
Ph: 301-468-6004, ext. 406
Email: sbromberg@md.capconcorp.com.

Protein Symposium and Joint Meeting of the Argentinean Biophysical Society (SAB) and the Argentinean Society for Research in Biochemistry and Molecular Biology (SAIB)

November 17-21 • San Carlos de Bariloche, Argentina
This meeting is sponsored by: The National Agency for the Promotion of Science and Technology (ANPCyT), The National Research Council of Argentina (CONICET), Fundación Antorchas, Fundación Instituto Leloir, University of Buenos Aires, University of Quilmes, and The Protein Society.
Contact: Prof. José M. Delfino (delfino@qb.ffyb.uba.ar)
Prof. Fernando A. Goldbaum (fgoldbaum@leloir.org.ar)
Prof. Gonzalo de Prat Gay (gpratgay@leloir.org.ar)
Prof. Alejandro J. Vila (vila@arnet.com.ar)
Fx: (54 11) 4962 5457
Website: http://www.biofisica.dna.uba.ar/pssabsaib

DECEMBER 2003

American Society for Cell Biology 43rd Annual Meeting

December 13–17 • San Francisco, California
Late Abstract Submission/Revision Deadline: October 14, 2003
Ph: 301-347-9300; Fx: 301-347-9310
Website: http://www.ascb.org/meetings/am2003/main03mtg.htm

FEBRUARY 2004

Second International Conference on Ubiquitin, Ubiquitin-Like Proteins, and Cancer

February 5-7 • University of Texas M. D. Anderson Cancer Center, Houston
To allow for the optimal exchange of ideas, the conference will be limited to 175 attendees, who will be selected based on past contributions and/or newly developed interests in this field. In addition to the invited speakers, all attendees are encouraged to present posters and some will be invited to present them at the podium.
Due to the limited number of attendees, you are encouraged submit online applications prior to the November 15, 2003 deadline.
Contact: Amy Heaton; Ph: 713-745-6826
email: aheaton@mdanderson.org; website: http://www.sentrin.org

Biophysical Society 48th Annual Meeting

February 14–18 • Baltimore, Maryland
Abstract Deadline: October 5, 2003
Early Registration Deadline: December 12, 2003
Ph: 301-634-7114; Fx: 301-634-7133
Website: http://www.biophysics.org/annmtg/site-index.htm

50th Anniversary Gordon Conference on Isotopes in Biological and Chemical Sciences

February 15–20 • Ventura, California
Chair: David N. Silverman, Vice Chair: Charles L. Perrin
Email: silvrmn@ufl.edu
Website: http://www.grc.org/programs/2004/isotopes.htm

The 1st Gordon Research Conference on The Biology of 14-3-3 Proteins

February 22–27 • Ventura, California
Chairs: Haian Fu & David Klein, Vice-Chair: Alastair Aitken
Email: hfu@emory.edu
Website: http://www.grc.org/programs/2004/14-3-3.htm

APRIL 2004

Experimental Biology 2004

April 17–21 • Washington, DC
Deadline for Submission of Abstracts: November 12, 2003
Website: http://www.faseb.org/meetings/eb2004/

Xth International Symposium on Amyloid and Amyloidosis

April 18-22 • Tours, France
A transdisciplinary meeting that will address basic as well as clinical aspects of this field
Deadline for Receipt of Abstracts: December 15th, 2003
Abstracts must be submitted in English and only via the web via http://www.colloquium.fr/isaa2004 where you will find all the necessary information for submission.
COLLOQUIUM-ISAA2004, 12 rue de la Croix-Faubin 75557 PARIS cedex 11 (France); Ph: +33 (0)1 44 64 15 15
Fx: +33 (0)1 44 64 15 16; email: isaa@colloquium.fr

JUNE 2004

American Society for Biochemistry and Molecular Biology Annual Meeting and 8th IUBMB Conference

June 12–16 • Boston, Massachusetts
Contact: Kelly Gull; Ph: 301-634-7145; Fx: 301-634-7126
Email: kgull@asbmb.faseb.org; Website: www.asbmb.org/meetings

JULY 2004

4th ANNUAL CONFERENCE OF FOCIS (Federation of Clinical Immunology Societies)

July 18-23 • Montréal, Canada
Deadlines
Abstract submission: January 23, 2004
Travel Award applications (CSI and ICI: November 15, 2003
Travel Award applications (FOCIS): January 23, 2004
Early Registration: April 30, 2004; Website: www.immuno2004.org

AUGUST 2004

12th International Conference on Second Messengers and Phospoproteins

August 3–7 • Montreal, Canada
Contact: smp2004@eventsintl.com
Website: http://www.secondmessengers2004.ca

NOVEMBER 2004

4th International Congress on Autoimmunity

November 3–7 • Budapest, Hungary
Deadline for Receipt of Abstracts: June 20, 2004
Contact: 4th International Congress on Autoimmunity Kenes International—Global Congress Organisers and Association Management Services
17 Rue du Cendrier, PO Box 1726
CH-1211 Geneva 1, SWITZERLAND
Ph: +41 22 908 0488; Fx: +41 22 732 2850
Email: autoim04@kenes.com
Website: www.kenes.com/autoim2004

JULY 2005

30th FEBS Congress — 9th IUBMB Conference, 2005 The Protein World; Proteins and Peptides: Structure, Function and Organization; Science is Fun: A Conference for Your Creativity

July 2–5 • Budapest, Hungary
Contact: Ms. Franciska Morlin, Chemol Travel Congress Dept.
H-1366 Budapest, P.O.Box 28, Hungary
Ph:+36-1-266-7032, Fx: +36-1-266-7033
Email: incoming@chemoltravel.hu; www.febs-iubmb-2005.com

Department Heads Take Note:

ASBMB Offers Free Membership to New Ph.D.s

ASBMB is now offering a free one-year Associate membership to all students who have, within the past year, earned a Ph.D. degree in the molecular life sciences or related areas.

ASBMB implemented this program as a way to recognize the significant accomplishment of earning the Ph.D., and to provide new Ph.D.s with something tangible and of economic value. Membership in ASBMB brings with it a free subscription to the online versions of the *Journal of Biological Chemistry* and *Molecular and Cellular Proteomics,* as well as subscriptions to *The Scientist* and the Society's magazine, *ASBMB Today*, discounts on other publications, and a host of other benefits.

The Society is asking department chairs to provide ASBMB with the names and addresses of each new Ph.D. recipient from their institutions. Upon receipt of this information, we will write the new Ph.D.s to congratulate them on their accomplishment and offer the free one-year membership in ASBMB. Names and addresses of the new Ph.D.s should be sent to:

Kathie Cullins
Membership and Subscriptions Manager
American Society for Biochemistry
& Molecular Biology
9650 Rockville Pike
Bethesda, MD 20814
Email: asbmb@asbmb.faseb.org

This is an ongoing project; please advise us whenever a student in your department earns the Ph.D., so that we can make this free membership offer to him or her.

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