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See page 30 for New Clara Benson Travel Fellowship Award

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ASBMB Today

AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY

OCTOBER 2005,
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features

ON THE COVER:

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AWARDS OF EXCELLENCE:
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COLUMNS & EDITORIALS
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BRONZE AWARD WINNER 2003

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Comments

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Member Supports ASBMB Stand on 'Intelligent Design'

Following is a letter from a member to ASBMB President Judith Bond in support of her letter to President Bush (see article on page 4 of the September issue of *ASBMB Today*) concerning his comments on the teaching of "Intelligent Design" in science classrooms. Dr. Bond's reply follows.

Dear Dr. Bond,

Thank you for the letter you wrote to President Bush in response to his comments on the teaching of Intelligent Design. I fully support the position that ID is not science and should not be taught as such. I hope to see ASBMB and FASEB play a greater role in educating the public and politicians about this important issue, especially in communicating the fact that the concept of biological evolution is not a scientific controversy and is supported by overwhelming evidence.

Thanks again for your efforts.

Mark Hahn
ASBMB member (since 1994)
Woods Hole Oceanographic Institution

Dear Dr Hahn,

Thanks for your message. We agree this is an important issue in our society, and would like to play a role in reaching the public on the points you articulated so well. Among other things, we will be holding sessions at our centennial meeting in San Francisco to help our members bring up the issues in public settings and with politicians.

Judith Bond
ASBMB President

Evolution Not Taught Properly

Dear Editor:

I am contacting you about an article by Peter Farnham in the August 5 issue of ASBMB Today. He reports on a future ASBMB symposium on teaching Evolution. On the bottom of page 10 and the top of page 11 is the following statement: "However, Justice Antonio Scalia, in a dissenting opinion. left the door open to teaching alternative theories of how life began on earth." This sentence is in the context of the attacks on the Darwin's Theory of Evolution. But the Theory of Evolution has NOTHING to do with how life began. In fact, in a March 29, 1863 letter to J. Hooker, a fellow scientist, he states: "It is mere rubbish thinking at present of the origin of life; one might as well think of the origin of matter." This letter was written after the publication of Origin of Species.

A major problem that we have in fighting Intelligent Design people is the fact that Evolution is not taught properly in our schools, as emphatically demonstrated by the above. This should be part of the program of the planned Symposium.

Bernard F. Erlanger, Ph.D.
Columbia University

Tell Us What You Think

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.

Dr. Judith Bond

New Director of the Center for Scientific Review (CSR) at NIH: Toni Scarpa

Antonio Scarpa, MD/PhD, was sworn-in as the new Director of the National Institutes of Health CSR on September 15. Toni received his MD and PhD in Pathology at the University of Padua in 1966 and 1970, respectively. He did postdoctoral work at the Weizman Institute of Science in Israel, and then rose through the academic ranks in biochemistry and biophysics at the University of Pennsylvania. In 1986, he went to Case Western Reserve University as Professor and Chair of Physiology. He has many years of experience as a productive research scientist in the area of cellular and molecular mechanisms of ion transport and homeostasis, and he has served the profession as a member of study sections and as an editor of journals and books.

At the swearing-in ceremony, Dr. Story Landis, Director of NINDS, and previously a Chair at Case, described Toni as rigorous, fair, creative, and a builder of 'bridges'—particularly at the interface of basic science and medicine. Dr. Elias Zerhouni described Toni as a 'Renaissance Man,' with a 'can do,' pragmatic spirit who brings intelligence and creativity to the CSR directorship.

The CSR is the major portal of communication between the NIH and the research external community, and its mission is to fund the most promising science. The CSR reviews 90% of the grant application (~ 80,000 grants per year) that NIH considers for funding. Approximately 15,000 scientists serve CSR through reviewing activities. It is the heart of the NIH peer-review system.

Toni's vision is to increase the transparency, and enhance communication and efficiency of the peer-review system; shorten the review cycle and recruit excellent reviewers. He plans to examine and institute changes in the review of proposals to align the NIH with changes in the world by focusing, for example, on chronic as well as acute diseases, and paying attention to the basic mode and culture of research in our institutions. As we all know, instituting changes will be a daunting challenge. As Dr. Zerhouni cautioned, "Embracing change is like embracing a cactus".

Meredith Bond, Professor and Chair of Physiology at the University of Maryland Biotechnology Institute, and wife of Dr. Scarpa; Toni Scarpa,Director of CSR; Judith Bond, President ASBMB.

The good news is that Toni brings insight and experience of an experimental scientist and academic administrator to the NIH peer-review system. He brings energy, creativity, a pragmatic attitude, and determination to make the system better.

The bad news is that he is arriving at a time when legislators are not likely to raise the NIH budget to even meet the costs of inflation. Funding to combat terrorism, fight wars and recover from national disasters may well be diverted from allocations for investigator initiated research. There are many concerns in the scientific community about whether the new structure of the CSR review sections is serving the needs of the scientific community, new investigators, productive scientists, and important areas of research (e.g., structural biology, bacterial pathogenesis, many aspects of fundamental research). Many feel that critical areas of research are slipping between the cracks of the 'new review system'. Those of us who served on study sections of the past are wary about some of the new practices in the operation of the study sections, such as excessive reliance on ad hoc members, and lack of experienced scientists to review interdisciplinary projects, as well as the low percentile of grants being funded.

Toni has his work cut out for him. It will be our responsibility to work with him.

Note: Toni's wife Meredith Bond (no relation to Judith Bond or James Bond) is also a member of the JBC editorial board.

Judith Bond
President, ASBMB

by Peter Farnham, CAE, ASBMB Public Affairs Officer

NIH Reauthorization Effort Due This Fall

House Energy and Commerce Chairman Joe Barton (R-TX) has made it clear in recent weeks that he intends to introduce and pass an NIH reauthorization bill in this Congress. As a first step, his staff began circulating a "discussion draft" of such a bill in July. A second version, reflecting some—but not all—comments received from members of Congress and the science community, has been making the rounds in Washington since late August. Unfortunately, the very items in the bill to which Barton seems most committed are also the elements to which the science community is most opposed.

One of these elements is a major reorganization of the NIH. A few words of background—each year, when the NIH appropriations bill is considered, the individual institutes and centers are considered separately for purposes of appropriating money. Under the Barton plan, the institutes would be divided up into two main groups—"mission specific" and "science enabling" institutes. Congress would now appropriate money to these two main groups, and leave it up to the NIH Director (within certain limits) to distribute the money to the institutes. Further, the number if institutes and centers would be fixed at no more than 24 (a copy of the Barton bill will be on the ASBMB home page under the "What's New" column throughout September and October).

Barton cites as authority for this reorganization a July 2003 report, *Enhancing the Vitality of the National Institutes of Health: Organizational Change to Meet New Challenges*, released by the Institute of Medicine that made certain recommendations regarding the organization of NIH, including that Congress review the number of NIH institutes (however, while the report recommended that consideration be given to merging a couple of institutes, it also recommended that Congress merely set up a process to study the issue; it specifically cautioned against a wholesale reorganization).

Given this new "power of the purse," this provision as well as others in the bill would result in the NIH Director receiving a great deal of new power at the expense of the institute directors. While this power would be limited in certain ways, so far, there is little enthusiasm in the scientific community for the proposal

What's the Hurry?

Barton is most eager to pass an NIH reauthorization bill this year—it is one of his top priorities—and it is a fair question to ask why (Barton's committee has held eleven hearings on the topic). While reauthorizing NIH is important in itself, there appears to be more at stake, however. How Congress divides power over federal agencies is a major factor.

Barton is very concerned that over the years, congressional authorizing committees have yielded power to the appropriations committees. In NIH's case, the last time it was authorized was more then ten years ago, and since that authorization bill expired, appropriators, who are ideally supposed to concern themselves with money, have been implementing policy and organizational changes that are usually the purview of the authorizing committees. In short, Barton is tired of this state of affairs, and thus wants to restore authorization power to the committees where it belongs.

Barton's top aide working this issue, Cheryl Jaeger, has been meeting with the scientific community in an effort to line up support for the bill. Jaeger has stated in several public discussions of the draft bill that Barton is willing to work with the scientific community and is willing to be flexible on many aspects of it, but only up to a point. She has pointedly noted that Barton is not interested in "legislating the status quo" and the scientific community has to keep this in mind. However, she also has stated that Barton is not trying to harm NIH, but rather, to help demonstrate the valuable work the agency is conducting and to ensure that public money spent at NIH is a wise investment.

Can This Bill Pass?

Looking ahead, one sees a rocky road for the Barton bill. First and foremost, the bill has not even been introduced in the House yet. And, based on the public response so far to the discussion draft, it is likely to have little if any support once it is.

Second, there is no indication that a similar bill will be introduced in the Senate any time soon. In addition, the Senate will be focusing on two Supreme Court vacancies this fall, as well as finishing up its versions of appropriations bills (the Senate is far behind the House in this important work; although the House has passed all its appropriations bills, so far only two have become law). Finally, efforts to fix blame for the devastating effects of Hurricane Katrina and its chaotic aftermath will no doubt take up a lot of valuable time between now and the end of the year.

Continued on next page

Evolution Watch

Since the theory of evolution, creationism, and intelligent design are now being discussed at the highest levels of government as education and public policy issues, *ASBMB Today* is going to start a regular update—of which this is the first—on events and news in this area.

New Photos Found of 1925 Scopes "Monkey" Trial

At a recent seminar at AAAS headquarters in Washington, science historian Marcelle LaFollette lectured on a treasure-trove of previously unknown photos taken in Dayton, Tennessee, during the July 1925 trial of physics teacher John Scopes for teaching evolution, in violation of a state law. The photo at right shows Clarence Darrow (who represented Scopes), thumbs hooked in his galluses, cross-examining prosecutor William Jennings Bryant. The trial had been moved outside because of the intense heat.

Scopes almost certainly appears in the photo above; LaFollette says he is probably the second seated fellow from the left in the foreground, with the straight hair and white shirt.

This and other photos were taken by Watson Davis, a photographer in the pay of the Science Service, a news and science advocacy organization in its infancy at the time (but still extant today). Davis went on to lead the organization until his death in the 1960s.

Darrow interrogated Bryant for two hours, and the next day John Scopes was convicted of teaching evolution and was fined $100. The Butler Act making the teaching of evolution illegal in Tennessee was not repealed until 1967. Bryant, a three-time democratic presidential candidate, dropped dead six days after the trial.

Interestingly enough, LaFollette said that Scopes was a physics and math teacher, and never taught a single class on evolution. He agreed to be arrested for the crime because a group of businessmen in Dayton thought it would be good for business if the town got a lot of publicity, so they arranged for the whole show. The ACLU also got into the act because they were concerned about efforts to limit free speech, and so arranged for Darrow to defend Scopes.

The photo—in which Darrow is closely eyeing Bryant who is wearing a confident, faint smile—is one of the great and evocative photos in the history of American science, and an eerie reminder of the continuing struggles we face in science education today over the issue of evolution, as shown in the next item.

UC System Sued for Discriminating against High Schools Teaching Creationism

The Associated Press reported in late August that a group representing more than 800 religious schools, the Association of Christian Schools International, has filed a lawsuit accusing the University of California system of discriminating against high schools that teach creationism and other conservative Christian viewpoints. The suit claims that UC admissions officials have refused to certify high school science courses that use textbooks challenging Darwin's theory of evolution.

A lawyer for the association told AP that the UC policy violates the rights of students and religious schools. A UC spokeswoman said the university has a right to set course requirements.

New Poll Shows Public Wants Creationism Taught along with Evolution

Two-thirds of the American public wants creationism taught alongside evolution in science classes, according to a new poll released on August 30 by

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But ultimately, the bill will succeed or fail on the strength of its proposals and whether the Congress and the scientific community can be convinced that NIH will be better off under the new structure. This is probably a tough sell. As one prominent ASBMB member told *ASBMB Today*, "Now that I'm old, I tend to be wary of overhauling something like NIH under the guise of improvement. More important, I distrust putting too much discretionary power in the hands of a Presidential appointee."

by Peter Farnham, CAE, ASBMB Public Affairs Officer

DHHS Revises NIH Employee Conflict of Interest Regs; Most ASBMB Recommendations Accepted

The Department of Health and Human Services (DHHS) released its revised "Supplemental Standards of Ethical Conduct for Employees of the Department of Health and Human Services" (mostly pertaining to NIH and Food and Drug Administration employees) on August 31, and most of ASBMB's April 2005 recommendations on needed changes in the draft regulations were accepted.

The regulations were issued in draft form in February. They called for very stringent restrictions on stock ownership among NIH employees, their wives and family members; limited outside employment and charitable work they could perform; severely restricted their participation in academic and scientific societies; and made it almost impossible for a society such as ASBMB to present a scientific award to an NIH employee.

These and other restrictions were proposed to address a problem that first came to public attention in December 2003, when it was reported in the *Los Angeles Times* and other papers that hundreds of NIH employees had accepted money, cash awards, and travel funds from academic institutions, pharmaceutical companies and trade associations without reporting this on their financial disclosure forms or in many cases seeking permission before doing so.

The draft regulations provoked widespread outrage among NIH employees, and over 1200 of them, as well as some of their wives and family members, submitted comments on the draft regulations. The anger over the regulations even prompted the reinvigoration of a previously moribund staff organization at NIH, the Assembly of Scientists, which developed an alternative proposal to address conflict of interest issues. While DHHS did not accept the Assembly's specific recommendations, the agency did note that the Assembly had some influence in DHHS's revised regulatory scheme; DHHS now differentiates between NIH employees "as to rank, duties, and their level of responsibility for matters affecting public health and clinical research protocols involving human subjects," unlike in the draft regulations which treated all NIH employees alike. The most stringent restrictions now only affect a few hundred senior NIH officials.

ASBMB commented on the draft regulations in a letter to DHHS in April, noting six major objections and recommending that the regulations be withdrawn and redrafted. The ASBMB letter is available on the public affairs page on the Society website.

While the recommendations were not withdrawn, they were substantially redrafted, and at least four of the ASBMB recommendations were accepted.

First, professional and scientific societies such as ASBMB are removed form the list of entities known as "substantially affected organizations" (SAO) with which NIH employees are prohibited from engaging in outside activities. SAOs are mostly commercial entities such as pharmaceutical companies.

This change allows NIH employees to participate in scientific societies such as ASBMB as officers or committee or board members, and also allows NIH employees to teach, speak, write or edit for such organizations and their journals (with prior approval). NIH employees can also teach a course that requires multiple lectures; engage in clinical practice; and present a CME or CME-like lecture.

Regarding stock ownership restrictions, senior employees (and their spouses and minor children) may own up to $15,000 in stock in a SAO, and an aggregate interest in SAO sector funds of up to $50,000. Non-senior employees may hold any amount of interest in a SAO, with certain exceptions where necessary. Under the interim rule, senior employees could not hold any interest in a SAO and non-senior employees were allowed up to $15,000 per SAO. In general, only those employees required to file a financial disclosure report, or who serve as clinical investigators identified on an NIH clinical study, are required to report the value of any interest in a SAO.

Regarding awards, restrictions put in place by the draft regulations have been eliminated. Now, with prior approval, employees (including senior level) can accept gifts associated with bona fide awards for meritorious achievement. The only restriction is that if the employee's duties or those of any subordinates can affect the entity giving the award, gifts valued in excess of $200 may not be accepted. This change appears to allow NIH employees in most cases to accept ASBMB awards.

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Emerging Staph Strains Increasingly Deadly and Deceptive

A study of how the immune system reacts to strains of antibiotic-resistant *Staphylococcus aureus* bacteria—emerging strains that sicken otherwise healthy people, or so-called "community-acquired" infections—has shown for the first time that these strains are more deadly and better at evading human immune defenses than more common *S. aureus* strains that originate in hospitals and other health-care settings.

In a paper released September 7 online in *The Journal of Immunology*, scientists from the National Institute of Allergy and Infectious Diseases (NIAID) describe how community-acquired *S. aureus* strains that survive treatment with the methicillin family of antibiotics can evade immune defenses. Infections from community-acquired methicillin-resistant *S. aureus*, or MRSA, are difficult to treat and are increasing nationally at an alarming rate, say experts.

Scientists at NIAID's Rocky Mountain Laboratories (RML) in Hamilton, Montana, and colleagues examined the ability of MRSA strains to cause disease in mice and avoid destruction by human white blood cells called neutrophils. Neutrophils, which typically ingest and then kill harmful bacteria, make up about 60% of all white blood cells and are the first line of defense against bacteria. Scientists know that community-acquired strains differ from hospital strains, but they don't know why the community strains cause more serious infection in otherwise healthy people.

The work also identified specific *S. aureus* genes that potentially control the bacterium's escape from neutrophils. Among thousands of *S. aureus* genes analyzed in the five different strains used in the study, the scientists identified a large group of genes whose role in helping spread infection is unknown. RML's Dr. Frank DeLeo, the investigator who directed the study, and colleagues plan to determine if some of the unknown genes help promote disease. If they can learn which genes control the ability of *S. aureus* to evade and destroy neutrophils, their work could lead to new medical treatments.

"Each day physicians around the world are stymied by the inability to effectively treat patients suffering from severe *S. aureus* infections," says NIAID Director Anthony S. Fauci, M.D. "There is a critical need to develop new treatments against late-stage disease caused by antibiotic-resistant strains, and this promising work offers several new approaches."

According to the Centers for Disease Control and Prevention, "recent reports of 'community-acquired' MRSA infections raise concern … If MRSA becomes the most common form of *Staphylococcus aureus* in a community, it will make treatment of common infections much more difficult." The April 7, 2005, issue of *The New England Journal of Medicine* refered in an editorial to "… an epidemic of MRSA in the community."

S. aureus strains acquired in health-care settings can be challenging to resolve because of antibiotic resistance, which limits the choices for treatment. But the situation can become more serious with the newer community-acquired strains, says Dr. DeLeo. "We do not know why cases of community-acquired MRSA infections are increasing, let alone how they flourish," he says. But scientists do know the community strains can cause more severe forms of disease.

Mild *S. aureus* infections such as impetigo, which typically forms small blisters on the faces of children, or cellulitis, an inflammation of skin or muscle tissue, can easily be treated and usually resolve in a matter of days. But *S. aureus* disease also can be much more severe and difficult to treat, affecting vital organs and leading to toxins poisoning the blood and infection overwhelming the heart. One of the most severe types of disease is necrotizing pneumonia, where bacteria destroy lung tissue.

"The reason that some mild infections become severe or fatal is not well understood, but virulence is often associated with certain strains," says Dr. Jovanka Voyich of RML, the study's lead author. To cause human disease, bacterial pathogens must avoid being killed by neutrophils. "These results," says Dr. Voyich, "suggest that community-acquired MRSA causes disease in healthy people in part because it has enhanced ability to circumvent killing by neutrophils."

In Ed Dennis' Lab Lipids

While genes and proteins have long held starring roles in biomedical research, lipids—fats and oils—often have a more direct effect on human health.

University of California, San Diego (UCSD) investigator Edward Dennis, Professor of Chemistry and Biochemistry and of Pharmacology in UCSD's Division of Physical Sciences and School of Medicine, is currently leading an ambitious national effort to produce a detailed understanding of the structure and function of lipids—cellular fats and oils—implicated in a wide range of diseases, including heart disease, stroke, cancer, diabetes, and Alzheimer's.

In response to the growing number of lipids expected to be discovered through lipidomics and in anticipation of the massive amounts of data that will be generated by the lipid community, an international group of scientists has developed a comprehensive classification, nomenclature, and chemical representation system for lipids. The details of the system appeared in the May 2005 issue of the Journal of Lipid Research, an ASBMB journal.

The new system is part of an effort by the Lipid Metabolites and Pathways Strategy (LIPID MAPS) consortium to produce a detailed understanding of the structure and function of all the lipids within a cell. The consortium is a large collaborative effort led by UCSD and funded by a $35 million "Glue Grant" from the National Institute of General Medical Sciences. The five-year grant involves more than 30 researchers at 8 universities, medical research institutes, and companies across the United States.

Serving as Director of LIPID MAPS is Dr. Dennis whose expertise in lipid research was recognized when he

Edward Dennis considers his tenure as Chair of the Keystone Symposia Board one of the most fulfilling experiences of his career

received the ASBMB-Avanti Award in Lipids at the ASBMB Annual Meeting in 2000. He explains the goals of LIPID MAPS as, "To characterize known lipids and identify new ones, quantitate the temporal and spatial changes in lipids that occur with cellular metabolism, and develop bioinformatics approaches that establish dynamic lipid networks. In order to coordinate their efforts with those of other groups, such as the Lipid Bank in Japan, the European Lipidomics Initiative, and the International Conference on the Biochemistry of Lipids based in Europe and to facilitate international collaboration, LIPID MAPS initiated the development of a comprehensive classification system for lipids suitable for data–basing and bioinformatics manipulations."

Lipid Classification and Databases

"The classification system was designed to be a broad-based scheme covering eukaryotic and prokaryotic sources, to include new classes of lipids which have been discovered in recent years, to be extensible to accommodate future novel classes and to be compatible with modern-day informatics requirements," explains Dr. Eoin Fahy, of the San Diego Supercomputer Center at UCSD, who serves as LIPID MAPS' Bioinformatics Project Coordinator.

LIPID MAPS' classification divides lipids into eight primary categories: fatty acyls, glycerolipids, glycerophospholipids, sphingolipids, sterol lipids, prenol lipids, saccharolipids, and polyketides. These categories are based on the functional backbone of the lipid molecule from a chemical standpoint and is lipocentric. The categories are further subdivided into classes and subclasses to handle the existing and emerging arrays of lipid structures.

In conjunction with their proposed lipid classification scheme, the group has also proposed a nomenclature system. "The nomenclature rules adopted by LIPID MAPS follow existing IUPAC-IUBMB rules closely and should not be viewed as a competing format," emphasizes Fahy. "The main differences involve clarification of the use of core structures to simplify systematic naming of some of the more complex lipids, provision of systematic names for recently discovered lipid classes, and clarification of abbreviations and shorthand names for lipids."

A key part of the classification system is a 12-digit identifier for each unique lipid molecule, called a LIPID ID. The identifier is based on the classification scheme and will be used mainly in databases, such as the LIPID MAPS database. The LIPID ID format provides a systematic means of assigning unique IDs to lipid molecules and allows for the addition of large numbers of new categories, classes and subclasses in the future. The first two characters (1-2) of the ID contain the database identifier (e.g. LM for LIPID MAPS). Characters 3-4 correspond to the lipid category, 5-6 to the class within that category, and 7-8 to the subclass. The last four characters of the ID comprise a unique identifier within a particular subclass and are randomly assigned.

The new classification system has already been implemented, and scien-

Take the Spotlight

tists from Europe, Asia, and the U.S. are looking for it to gain widespread acceptance. "Inevitably, there will be some resistance, possibly from others who have created alternative schemes or who are long-time proponents of other formats," acknowledges Dr. Fahy. "However, the Journal of Lipid Research manuscript outlining this classification scheme contains an international panel of authors (several of whom are not involved with the LIPID MAPS project) and has also been reviewed by several other experts in the lipid research field, so it represents a well-balanced consensus view of what a modern-day lipid classification scheme should be."

Examples of the classification scheme and interactive access to it can be viewed on the LIPID MAPS website at http://www.lipidmaps.org.

Lipid Maps

Knowledge gained through the Lipid Maps Consortium will help medical researchers develop better diagnostic devices and more effective ways to treat some of the common diseases that result from problems in the way cells use lipids. Imbalances in lipids cause or play a role in diseases that affect millions of people worldwide. High cholesterol has been implicated in cardiovascular disease, which killed about 950,000 Americans in 2002, according to the American Heart Association. Lipids produced by immune system cells are involved in inflammatory diseases such as rheumatoid arthritis, sepsis, asthma and inflammatory bowel disease, and also play a role in Alzheimer's disease and cancer. Essential to life, lipids come in a wide variety and have many functions in the cell. They can be stored as an energy reserve for the cell. They make up cell membranes and are involved in communication within and between cells. "Lipids are the most important biomolecules because they are the ultimate controllers and regulators of our bodily processes," says Dennis. The Consortium is divided into six focus

areas. The lipidomics focus area will investigate the six major groupings of lipids that occur in mammalian cells. Other scientific focus areas will cover informatics, cell biology, lipid detection and quantitation, and lipid synthesis and characterization. More than 40 faculty-level researchers at 15 universities and three corporations are involved in the actual research or as participating investigators advising on the actual experiments.

The Keystone Symposium

Dr. Dennis is also well known for his role in leading the Keystone Symposium, a Silverthorne, Colorado based organization that serves as a catalyst for the advancement of biomedical and life sciences by connecting scientists within and across disciplines at conferences and workshops held at venues that create an environment conducive to information exchange, generation of new ideas, and acceleration of applications that benefit society. Keystone sponsors over 50 scientific symposia a year, mostly at Western ski resorts, but also now at locations throughout the world. Over 12,000 biomedical scientists attend these meetings each year including about a third grad students or postdocs, many on scholarships provided by Keystone. This month, for example, it is hosting symposia on Tissue-Selective Nuclear Receptors in Breckenridge, Colorado, and in October will run a symposia in Singapore on Stem Cells, Senescence, and Cancer. Over 400 bioscientists are expected to attend the Singapore meeting.

Organized in 1972 as the UCLA Symposia on Molecular and Cellular Biology, the organization later became a subsidiary of The Keystone Center and was renamed the Keystone Symposia. In 1997, the Keystone Symposia became an independent 501(c)(3) nonprofit organization based in Silverthorne, Colorado. Dennis served as President and Chair of Keystone's Board of Directors for the first eight years, a period when the Keystone organization grew dramatically and the number of symposia increased substantially. Currently a member of the Keystone Board, he considers his time as founding Chair one of the most fulfilling experiences of his career.

An avid skier, Dr. Dennis is seen here on one of the slopes near Keystone Symposia's headquarters in Colorado.

The Dennis Group's Focus

The Dennis Group has studied the structure and function of phospholipases for the past 35 years, and has extensively characterized the cobra venom phospholipase A2 and from these studies developed a model for the action of soluble enzymes at phospholipid surfaces. These studies were then extended to numerous other enzymes that act on lipid substrates at membrane and micellar interfaces. The lab also explored the role that these enzymes play in various cell functions in macrophages and other cells, and in cellular signal transduction in general.

"Our laboratory," explains Dr. Dennis, "is focused on understanding the regulation of lipid second messengers and signal transduction processes and especially the role of various phospholipases in their generation. Special attention is paid to the cytosolic, secreted, and membrane-bound phospholipase A2s (PLA2) responsible for the control of prostaglandin and leukotriene biosynthesis in macrophage cells. These are produced from arachidonic acid released by PLA2 upon cell stimulation. Our goal is to characterize and elucidate the regulatory mechanisms of various phospholipase A2s both in vitro and in the intact cell."

NIH News Continued ...

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Senior NIH scientist Edward Korn, with the National Heart, Lung and Blood Institute (and an active member of the Assembly of Scientists), tells *ASBMB Today* that "The revisions made in the final rule fully satisfy most of our concerns, in particular those having to do with the restrictions the interim rule imposed on interactions of intramural scientists with academia and professional societies, and the stock divestiture issue. The issue of consulting with industry remains, but this is a difficult problem and not just for NIH. It is my hope and expectation that this positive response by NIH and DHHS will remove any retention or recruitment problems that the interim rule may have created."

A summary of the new regulations, as well as a link to the final regulations themselves, is available on the NIH home page (www.nih.gov). Click on the phrase, "conflict of interest information" in the lower left portion of the home page.

CERAMIDES AND SPHINGOLIPIDS

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ARC-1024	N-Acetyl-D-erythro-spingosine [acetyl-1-^{14}C]		50 µCi	$999
ARC-1655	N-Acetyl-D-erythro-sphingosine-1-phosphate, [acetyl-1-^{14}C]		10 µCi	$1199
ART-829	Ceramide trihexosides [galactose-6-^{3}H]		10 µCi	$549
ART-460	Dihydrosphingosine D-erythro [4,5-^{3}H]		250 µCi	$1049
ART-618	Dihydrosphingosine-1-phosphate, D-erythro [4,5-^{3}H]		10 µCi	$549
ART-634	Dihydrosphingosine-D-erythro-phosphocholine [4,5-^{3}H]		50 µCi	$999
ART-1191	Dimethyl-D-erythro-sphingosine, [methyl-^{3}H]		50 µCi	$1199
ART-830	Galactosyl ceramide [galactose-6-^{3}H]		10 µCi	$699
ARC-1331	Glucocerebroside [glucosyl ceramide (stearoyl-1-^{14}C)]		10 µCi	$1349
ART-669	Sn-Glycero-3-phosphocholine, 2-palmitoyl-1-0-hexa/octadecyl [1,2-^{3}H]	50 µCi		
ART-668	Sn-Glycero-3-phosphoserine, 2-palmitoyl-1-0-hexa/octadecyl [1,2-^{3}H]		250 µCi	$1549
ART-600	N-Hexanoyl-D-erythro-dihydrosphingosine [4,5-^{3}H]		50 µCi	$999
ART-598	N-Hexanoyl-D-erythro-sphingosine [hexanoyl 6-^{3}H]		50 µCi	$849
ARC-1076	N-Hexanoyl-D-erythro-sphingosine [hexanoyl 1-^{14}C]		50 µCi	$999
ARC-555	Lyso-3-phosphatidylcholine, L-1- [methyl-^{14}C]		10 µCi	$849
ART-677	Lyso-3-phosphatidylcholine, L-1- [methyl-^{3}H]		50 µCi	$999
ART-1176	Lysosphingomyelin, [methyl-^{3}H]		10 µCi	$1149
ART-601	N-Octanoyl-D-erythro-dihydrosphingosine [4,5-^{3}H]		50 µCi	$1049
ART-792	N-Octanoyl-D-erythro-dihydrosphingosine [4,5-^{3}H] 1-phosphate		10 µCi	$949
ARC-1073	N-Octanoyl-D-erythro-sphingosine [octanoyl 1-^{14}C]		50 µCi	$1049
ART-599	N-Octanoyl-D-erythro-sphingosine [octanoyl 8-^{3}H]		50 µCi	$1049
ARC-1649	N-Octanoyl-D-erythro-phytosphingosine, [octanoyl-1-^{14}C]		50 µCi	$1099
ARC-1653	N-Octanoyl-D-erythro-phytosphingosine-1-phosphate, [octanoyl-1-^{14}C]	10 µCi		
ARC-1656	N-Octanoyl-D-erythro-sphingosine-1-phosphate, [octanoyl-1-^{14}C]		10 µCi	$1199
ARC-1650	N-Oleoyl phytosphingosine, [oleoyl-1-^{14}C]		50 µCi	$1299
ARC-1654	N-Oleoyl phytosphingosine-1-phosphate, [oleoyl-1-^{14}C]		10 µCi	$1399
ARC-818	N-Oleoyl-D-erythro-sphingosine [oleoyl 1-^{14}C]		50 µCi	$1649
ARC-831	N-Palmitoyl-D-erytho-sphingosine [palmitoyl 1-^{14}C]		50 µCi	$1599
ART-899	N-Palmitoyl, [9,10-^{3}H] D-erythrosphingosine		50 µCi	$1199
ARC-772	Sphingomyelin (bovine) [choline methyl-^{14}C]		10 µCi	$519
ART-481	Sphingomyelin (bovine) [choline methyl-^{3}H]		50 µCi	$719
ART-490	Sphingosine D-erythro [3-^{3}H]		50 µCi	$679
ART-859	Sphingosine D-threo [3-^{3}H]		50 µCi	$849
ART-778	Sphingosine, D-erythro-[3-^{3}H]-1-phosphate		10 µCi	$1349
ART-1283	Sphingosine D-threo-[3-^{3}H]-1-phosphate		10 µCi	$1349
ARC-1612	Sphingosine D-erythro-1-phosphate, [^{14}C]			Inquire
ARP-144	Sphingosine D-erythro-1-phosphate, [^{33}P]		10 µCi	$1049
ARC-1815	N-Stearoyl-D-erythro-sphingosine [stearoyl-1-^{14}C]		50 µCi	$1599
ART-1408	N-Stearoyl-D-erythro-sphingosine [stearoyl-9,10-^{3}H]		50 µCi	$999
ARC-1048	Sulphatide [stearoyl 1-^{14}C]		50 µCi	$1499
ARC-1492	N,N,N-Trimethyl-D-erythro-sphingosine, [N-methyl-^{14}C]		10 µCi	$699
ART-1138	N,N,N-Trimethyl-D-erythro-sphingosine, [N-methyl-^{3}H]		10 µCi	$699

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Scientists Discover How Plants Disarm Toxic Effects of Excessive Sunlight

A newly discovered pathway by which cells protect themselves from a toxic byproduct of photosynthesis may hold important implications for bioenergy sources, human and plant disease, and agricultural yields, a team of University of Wisconsin-Madison bacteriologists announced June 6 in the *Proceedings of the National Academy of Sciences*.

Plants turn energy from sunlight into bioenergy through a chemical process called photosynthesis, which also produces oxygen in its breathable form. However, photosynthesis can also generate an alternate form of singlet oxygen, which is a highly reactive and toxic substance that destroys biological molecules.

"We've discovered a pathway that cells use to turn on certain genes and respond to singlet oxygen," says Timothy Donohue,* Professor of Bacteriology in the university's College of Agricultural and Life Sciences and lead researcher on the paper.

"This finding should make it possible to modify plants and other photosynthetic cells to avoid the toxic effects of singlet oxygen, which could impact agriculture and the treatment of human and plant disease, and aid the effort to create alternative bioenergy sources," Donohue says.

Donohue and his group studied a photosynthetic microbe and identified the cellular pathways it used to sense the presence of singlet oxygen and defend itself from this toxic substance. He notes that the response mechanism is likely highly conserved across species from microbes to plants and humans - and therefore very applicable to other fields of study.

For example, too much sunlight can actually be harmful to plants, because the heightened photosynthetic activity also means an increase in singlet oxygen. By modifying plants to enhance the protective pathway, "we could be able to get larger crop yield per photon of light," he says.

And by making cells more resistant to singlet oxygen, scientists may be better able to design bioenergy systems that use sunlight as an alternative to traditional fossil fuels. "By understanding how biology solves this problem, we can fine-tune the design of these systems to minimize the harmful effects of singlet oxygen and enhance energy production."

Reactive oxygen also plays an important role in human, animal and plant health, because it is often used as a host defense to inhibit the growth of unwanted microbial pathogens. In fact, it appears that even non-photosynthetic bacteria, including human and animal pathogens like Vibrio and Pseudomonads have systems to sense and protect themselves from singlet oxygen, says Donohue. Other reactive oxygen species—often called "free radicals"—are thought to be at the root of many debilitating diseases.

"There have been considerable advances in our understanding of how cells protect themselves from several reactive oxygen species," says Donohue. "However, nothing has previously been known about how cells alter gene expression to respond to singlet oxygen. We may now be able to design pharmaceuticals that target this response, and ultimately may help us mitigate disease."

** ASBMB member*

Evolution Watch continued ...

Continued from page 5

the Pew Forum on religion and Public Life and the Pew Research Center for the People and the Press.

The poll found that 42 percent of respondents believe that "living things have existed in their present form since the beginning of time." While 48 percent believed that humans had evolved, 18 percent of those said that evolution was "guided by a supreme being" and 26 percent said that evolution occurred through natural selection. In all, 64 percent said they were open to the idea of teaching creationism in addition to evolution.

The poll showed 41 percent of respondents wanted parents to have the primary say over how evolution is taught, compared with 28 percent who said teachers and scientists should decide and 21 percent who said school boards should. Asked whether they believed creationism should be taught *instead* of evolution, 38 percent were in favor, and 49 percent were opposed.

Robert Park, a University of Maryland physicist and long-time science policy commentator, notes that despite this latter "scary" statistic, "the tiny glimmer of hope for civilization was the number of inconsistencies in the responses, suggesting confusion over the meaning of the terms. There is room for education."

FASEB's Office of Public Affairs has a web page featuring tools for teaching evolution to K-12, statements by scientific societies regarding evolution, and other sources of information. The page is at www.faseb.org/opa/ppp/evolution.html.

The Pew report can be read at http://pewforum.org.

So You Think You Know Biochemistry History?

Try the ASBMB Centennial Quiz

Let's see how well you do answering these questions about events during ASBMB's first hundred years.

1. When and by who was the ß-oxidation of fatty acids deduced?
2. Who postulated a respiratory enzyme for the activation of oxygen and showed the requirement of iron in respiration, and in what year when was this done?
3. Who first crystallized an enzyme, urease, and proved it be a protein and when was this done?
4. Who discovered the urea cycle and when?
5. When and by whom was threonine discovered?
6. When and by whom was the central role of ATP in the energy transfer cycle postulated?
7. Who discovered that acetate is the precursor of cholesterol, and when was this done?
8. How many ASBMB members were Nobelists in 1946 and what were their names.
9. Who discovered the base equivalences in DNA, and when was this done?
10. How many ASBMB members were Nobelists in 1972, and who were they?

If you get all 10 of the answers to these questions right, you are entitled to be called an ASBMB Centennial Expert and will be eligible for all the perquisites thereof.

NOTE: Information for this test was supplied by William Lennarz, SUNY at Stony Brook, New York.

ANSWERS:

1. Knoop deduced the ß-oxidation of fatty acids in 1905
2. Warburg showed the requirement of iron in respiration in 1912.
3. Sumner first crystallized urease, in 1926.
4. Krebs and Henseleit discovered the urea cycle in 1933.
5. Rose discovered threonine, the last essential amino acid to be recognized, in 1935.
6. Lipmann postulated the central role of ATP in the energy transfer cycle in 1939.
7. In 1942, Bloch and Rittenberg discovered that acetate is the precursor of cholesterol.
8. Three ASBMB members were Nobelists in 1946; they were John H. Northrop, Wendell M. Stanley, and James B. Sumner.
9. Chargaff discovered the base equivalences in DNA in 1950.
10. There were five ASBMB Laureates in 1972: Gerald M. Edelman, Stanford Moore, Rodney Porter, William H. Stein, and Christian B. Anfinsen.

ASBMB to Honor Thomas Cech for Exemplary Contributions to Education

The ASBMB Awards Committee has selected Thomas R. Cech to receive the inaugural ASBMB Award for Exemplary Contributions to Education. Cech, President of Howard Hughes Medical Institute and Professor, Department of Chemistry and Biochemistry, University of Colorado, will receive the award at the 2006 ASBMB annual meeting, which also marks the centennial of ASBMB and its foundation publication, the *Journal of Biological Chemistry*.

The ASBMB Award for Exemplary Contributions to Education, a new award this year, will be given annually to a scientist who encourages effective teaching and learning of biochemistry and molecular biology through the scientist's own teaching, leadership in education, writing, educational research, mentoring or public enlightenment. It includes a cash prize as well as paid travel and expenses to present a plenary symposium lecture at the 2006 Society meeting. That lecture is currently scheduled for Sunday, April 2.

Does success in high school lead to success in science? Not necessarily says Cech, who won the Nobel Prize for his discoveries about the catalytic properties of RNA. "It isn't always true that the people who are the brilliant high school students, who get the highest grades on the exam, are the ones who do well as practicing, experimental scientists. There are a lot of skills in doing experimental science that can't be tested on standardized exams." B students, he notes, often "are the ones who end up doing the really great work in research."

"I think the general public perceives that there's a lot of homogeneity in the type of people who are good scientists," said Cech in a recent address. "It would be a pretty dull job if that were the case. The truth is that people with a wide variety of training, personality traits, skills in very different areas can contribute a lot to scientific discoveries.

"Certainly there are certain traits that scientists tend to have in common. But, it isn't always true that the people who are the brilliant high school students, who get the highest grades on the exam, are the ones who do well as practicing, experimental scientists. There are a lot of skills in doing experimental science that can't be tested on standardized exams. Although good mathematical ability, good quantitative ability, good analytical thinking ability are part of being a good scientist, there's a very hard-to-quantitate element. And it should be encouraging to those students who are the B students in high school and the B students in college that very often they are the ones who end up doing the really great work in research."

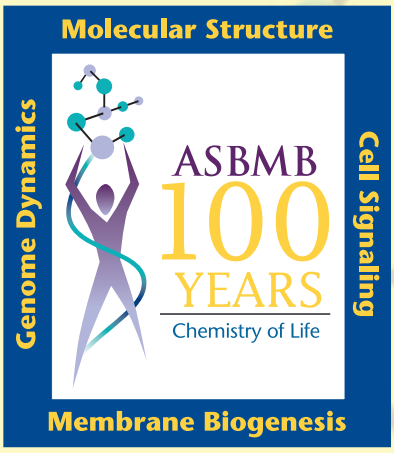
"My father, who loved physics as much as medicine," recalled Cech, "interjected a scientific approach and point of view into most every family discussion. I discovered science for myself in fourth grade, collecting rocks and minerals and worrying about how they were formed. By the time I was in junior high school, I would knock on Geology professors' doors at the University of Iowa, asking to see models of crystal structures and to discuss meteorites and fossils."

Research Areas

Thomas Cech's main research area is that of the process of transcription in the nucleus of cells. He studies how the genetic code of DNA is transcribed into RNA. In the 1970s, he had been studying the splicing of RNA in the unicellular organism Tetrahymena thermophilia when he discovered that an unprocessed RNA molecule could splice itself. In 1982, Cech became the first to show that RNA molecules are not restricted to being passive carriers of genetic information—they can have catalytic functions and participate in cellular reactions. RNA-processing reactions and protein synthesis on ribosomes in particular are catalyzed by RNA. RNA enzymes are known as ribozymes and have provided a new tool for gene technology. They also have the potential to provide new therapeutic agents - for example, they have the ability to destroy and cleave invading, viral RNAs.

Dr. Thomas R. Cech

Dr. Cech has a second, very different area of research, that of the structure and function of telomeres, the natural ends of linear chromosomes. He and his research group focus on the assembly, structure and function of telomerase, the enzyme that copies the telomeric sequences. The active site protein subunits of telomerase comprise a new class of reverse transcriptases, enzymes previously thought to be restricted to viruses and transposable elements. Telomerase, an important enzyme in biomedical terms, is activated in 90% of human cancers. Therefore, a drug that would inhibit its activity is much sought after as a cancer chemotherapeutic.



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2006 Program Co-Chairs: George M. Carman, Rutgers University and Laurie S. Kaguni, Michigan State University

www.asbmb.org/meetings

Thematic Meetings

MOLECULAR STRUCTURE

Macromolecular Structure and Dynamics
Andrej Sali, UCSF

Proteomics and Bioinformatics
Michael Snyder, Yale University
David S. Eisenberg, UCLA

Chemical Genetics and Drug Discovery
Chaitan Khosla, Stanford University
Kevan Shokat, UCSF

Glycobiology and Extracellular Matrix
Carlos B. Hirschberg, Boston University Goldman School of Dental Medicine

GENOME DYNAMICS

Genome Dynamics: Replication, Repair, and Recombination
Laurie S. Kaguni, Michigan State University

Chromatin: Structure, Expression, and Regulation
Sharon R. Dent, University of Texas M. D. Anderson Cancer Center

RNA: Structure, Metabolism, and Regulation
Alan D. Frankel, UCSF

Protein Synthesis, Folding and Turnover
William Merrick, Case Western Reserve University

CELL SIGNALING

Metabolic Regulation
Richard W. Hanson, Case Western Reserve University
Daryl K. Granner, Vanderbilt University

Signaling in Growth and Development
Michael B. Yaffe, MIT

Signaling in Aging and Disease
Natalie G. Ahn, University of Colorado at Boulder

MEMBRANE BIOGENESIS

Biochemistry and Molecular Biology of Lipids
George M. Carman, Rutgers University
Christian R.H. Raetz, Duke University

Structure, Function, and Biogenesis of Cell Membranes
William Dowhan, University of Texas-Houston Medical School

MINORITY AFFAIRS COMMITTEE SPONSORED SYMPOSIA

Juliette Bell, Fayetteville State University

Issues in Breast Cancer Among Minority Populations
Chair: K.V. Venkatachalam, Nova Southeastern University

Minorities and the HIV/AIDS Epidemic
Chair: Juliette Bell, Fayetteville State University

EPD/MAC Symposium – Undergraduate Student/Faculty Science
Chairs: Joseph Provost, Minnesota State University-Moorhead, Mark A. Wallert, Minnesota State University-Moorhead and Phillip A. Ortiz, Empire State College

EPD/MAC Symposium – Outreach and Public Education
Chair: Neena Grover, Colorado College

EDUCATION and PROFESSIONAL DEVELOPMENT: Focus on the Future, Shape the Debate

J. Ellis Bell, University of Richmond

Undergraduate Poster Session and Plenary Lecture: My Life in Science
Edmond H. Fischer, University of Washington School of Medicine and Edwin G. Krebs, University of Washington School of Medicine

Current Themes in Molecular Evolution
Chair: Michael M. Cox, University of Wisconsin – Madison

Plenary Lecture: Integrity and Independence of Scientific Thought
Elizabeth Blackburn, University of California, San Francisco

Matching Expectations: Employers and Education in the Molecular Life Sciences
Chair: Joy A. McMillan, Madison Area Technical College

The Classroom of the Future
J. Ellis Bell, University of Richmond

Award Lectures

Herbert Tabor/Journal of Biological Chemistry Lectureship

ASBMB-Amgen Award

ASBMB Award for Exemplary Contributions to Education

ASBMB-Merck Award

Avanti Award in Lipids

FASEB Excellence in Science Award

Herbert A. Sober Lectureship

Howard K. Schachman Public Service Award

Schering-Plough Research Institute Award

William C. Rose Award

Centennial Special Events

Centennial Opening Celebration

An Evening with the San Francisco Symphony

Birthday Bash, A Taste of San Francisco

ASBMB 5k Fun Run

Biochemistry and Molecular

Organizers: George M. Carman, Rutgers University,
Christian R.H. Raetz, Duke University Medical Center

Our understanding of lipid biosynthesis and its regulation has increased greatly over the past few years because of advances in biochemical, structural and molecular genetic approaches, combined with genomic and proteomic studies of both prokaryotic and eukaryotic organisms.

The *Biochemistry and Molecular Biology of Lipids* theme will primarily focus on the roles that lipids play in membrane biogenesis and function. It will cover recent mechanistic studies of lipid biosynthetic enzymes, as well as the structural biology of lipid flippases and pumps. Its complementary theme, *Structure, Function and Assembly of Membranes* (summarized in the August issue of *ASBMB Today*), focuses mainly on the protein component of membranes and integrates information on how membrane proteins interact with lipids.

The symposia of each theme will be scheduled on alternating mornings and afternoons to allow flexibility of attendance. In addition, social gatherings are planned following the afternoon symposia to foster interactions among the participants of both themes.

In addition to the invited speakers, postdoctoral fellows and graduate students will be chosen from the submitted abstracts to give short talks. We are pleased to announce that ASBMB-*Journal of Lipid Research*, Avanti Polar Lipids, Elsevier-*Biochimica et Biophysica Acta*, and Merck will sponsor cash awards, not only for outstanding short talks but also for excellent poster presentations by young investigators.

Regulation of Lipid Metabolism

The phospholipid precursor inositol plays a major role in the regulation of phospholipid metabolism in yeast. Dr. Susan Henry (Cornell University) will discuss a comprehensive microarray study of the kinetics of transcriptional changes in response to addition of inositol to the growth media of logarithmically-growing wild type yeast cells. The genome-wide changes in transcription will be presented in conjunction with analysis of simultaneous changes in lipid metabolism including phospholipids, neutral lipids, and sphingolipids. Given the essential roles that phospholipids play in the structure and function of cellular membranes, cells have the ability to cope with a variety of stress conditions by regulating expression of key phospholipid biosynthetic enzymes.

Dr. George Carman (Rutgers University) will discuss transcriptional mechanisms in yeast that control membrane phospholipid composition in response to the stress of zinc deprivation. Sphingosine-1-phosphate is a bioactive sphingolipid that regulates proliferation, differentiation, migration, and apoptosis) in higher eukaryotic organisms. Intracellular levels of sphingosine-1-phosphate are controlled in part by its irreversible degradation by the sphingosine-1-phosphate lyase enzyme encoded by the SPL gene. Recent studies have suggested that SPL expression affects animal development and cell fate decisions.


Dr. George M. Carman

Dr. Julie Saba (Children's Hospital Oakland Research Institute) will discuss studies exploring various aspects of sphingosine-1-phosphate lyase regulation, including conserved mechanisms of transcriptional regulation of the SPL gene, as well as pharmacological modulation of the enzyme.

Pharmacological Targets in Lipid Metabolism

Lipids such as essential fatty acids, sphingolipids, and cholesterol play important roles in cell signaling as lipid mediators and in membrane functions as components of cell membranes. Fatty acids are essential to life in all organisms. Interestingly, there are significant biochemical differences in the properties of the fatty acid biosynthetic machinery among species. Dr. Charles Rock (St. Jude's Childrens Research Hospital) will discuss how these differences are being exploited in efforts to develop antimicrobial drugs. Research in the laboratory of Dr. Sarah Spiegel (Virginia Commonwealth University School of Medicine) focuses on sphingosine-1-phosphate and the roles this lipid plays in cell growth, apoptosis, tumor angiogenesis, and immune responses. Two isoenzymes of the sphingosine kinase, the enzyme responsible for synthesizing sphingosine-1-phos-

Biology of Lipids


Dr. Christian Raetz

phate, have been identified.

Dr. Spiegel will discuss how the sphingosine kinase isoenzymes can both phosphorylate sphingosine yet have either opposite, overlapping, or complementary functions in cells. The brain contains more cholesterol than any other tissue in the body, and it uses a unique biochemical pathway to metabolism this essential lipid. Catabolism is accomplished by the enzyme cholesterol 24-hydroxylase, a microsomal cytochrome P450.

Dr. David Russell (University of Texas Southwestern Medical Center) will discuss the roles of cholesterol 24-hydroxylase and cholesterol turn over in the central nervous system.

Structural Biology and Mechanisms of Membrane Lipid Assembly

Recent advances in the field of membrane biogenesis, with a focus on model systems, will be addressed in this symposium. Dr. Christian Raetz (Duke University) will present an overview of the enzymatic assembly of outer membrane lipids in *Escherichia coli*, including recent studies of slow, tight-binding inhibitors. Compounds blocking the formation of outer membrane lipids are novel antibiotics, with potency in some instances rivaling that of ciprofloxacin.

Dr. JoAnne Stubbe (MIT) will discuss the mechanisms by which poly-ß-hydroxybutyrate granules are formed. One model is that the granules bud from the inner membrane of Gram-negative bacteria into the cytoplasm. This unique system, which has applications in biotechnology, shares some common features with lipoprotein formation in the endoplasmic reticulum of animal cells, and may address fundamental issues in the regulation of lipid metabolism.

Finally, Dr. Geoffrey Chang (Scripps Institute) will discuss his recent work on the structure and mechanism of MsbA, an essential inner membrane ABC transporter, closely related to mammalian MDR proteins. The *E. coli* MsbA protein is the flippase for some of the phospholipids generated on the inner surface of the inner membrane. MsbA is essential for growth and is absolutely required for the export of both phospholipids and lipopolysaccharide to the outer membrane. This symposium is intended to bring together investigators working at the forefront of membrane biochemistry, enzymology, structural biology, lipid metabolism, drug discovery, and microbiology.

Lipidomics of Metabolic Signaling

The systems biology exploration of genomics and proteomics of recent years has set the stage for a metabolomics revolution to identify and quantify the individual metabolites of cells. Lipids compose the major cellular metabolites engaged in biomolecular signaling, the generation of lipid second messengers and mediators as well as the major molecules of energy metabolism and membrane remodeling. This symposium will focus on several aspects of lipidomics highlighting specifically the eicosanoids, phospholipids, and sphingolipids as some of the important lipids comprising the lipidome.

The uses of new LC/MS techniques to separate, detect, and quantify individual molecular species of lipids with sophisticated extraction techniques and quantitative internal standards and changes in their levels with cellular perturbations will be emphasized. Dr. Edward Dennis (University of California, San Diego) will describe the LIPID MAPS approach to lipidomics and his detailed analysis of the time dependent changes in the levels of a large number of prostaglandins upon treatment with LPS and a homogeneous form of LPS called Kdo_2-Lipid A developed by the LIPID MAPS Consortium.

Dr. Alex Brown (Vanderbilt University School of Medicine) will describe his array analysis of over 500 molecular species of phospholipids and their changes upon LPS and Kdo_2-Lipid A treatment of RAW macrophage cells. Dr. Al Merrill (Georgia Institute of Technology) will discuss the numerous individual molecular species of sphingolipids and the creation of "Sphingomaps" to describe their metabolic interactions.

Glycobiology and Extracellular Matrix

Organizer: Carlos B. Hirschberg, Boston University Goldman School of Dental Medicine

Carbohydrates covalently linked to proteins and lipids play pivotal roles in the development of higher and lower eukaryotes, cell-cell and cell-extracellular matrices interactions, immunobiology, protein folding quality control and hormonal functions. The aim of this symposium is two fold (1) to give the general scientist an overview of some of the principal areas in biology where glycobiology and extracellular matrix components are essential to understanding biological functions and (2) to allow the specialist to hear about the latest developments of these areas. Each symposium will have three additional talks selected from submitted abstracts.

The Role of Glycans in Development and Disease

Dr. Hirschberg will discuss the role of the nucleotide sugar transporter/antiporter cycle in eukaryotic development and disease. This cycle, which occurs in all eukaryotes studied to date, has as its function the transport of nucleotide sugars into the lumen of the Golgi apparatus where they serve as substrates for glycosylation of proteins and lipids. Mutations in the cycle may lead to abnormal phenotypes e.g. failures in tissue development and to diseases such as Leukocyte adhesion deficiency syndrome II.

Lawrence Tabak (NIDCR, NIH) will discuss the roles of the many polypeptide: N-acetylgalactosaminyltransferases in development and disease of the craniofacial complex. Conserved throughout evolution, family members are expressed in spatially and temporally specific fashion during mouse, worm and Drosophila development. At least one Drosophila isoform, pgant 35A, is required for normal development. Recent work with mouse models point to multiple fuctional roles related to systems as diverse as bone development and innate and adaptive immunity. Mutations in the human gene GALNT3 have recently been shown to result in familial tumoral calcinosis.

Jacques Baenziger (Washington University) will discuss the role of glycoprotein hormones and the way in which unique sulfated sugars contribute to functions of the glycoproteins e.g. receptor activation and the development of neuronal connections. Glycoprotein hormones such as leutinizing hormone and thyroid stimulating hormone in the pituitary as well as the matrix protein tenascin-R and the LDL-receptor homolog SorLA/LR11 in the brain, each have carbohydrates that are selectively modified with terminal ß1,4-linked GalNAc-4-SO4 residues which contribute to the their biological function.

Glycans in Pathogenic Protozoa: the Sweet Touch of Death

The cell surface architectures of protozoan parasites are fined-tuned to their modes of infection and survival in their mammalian hosts and insect vectors. Furthermore, parasite surface molecules can subvert the host immune response. In many cases, parasite cell surfaces are dominated by GPI-anchored glycoproteins and/or GPI-related glycophospholipids. Depending on the species, cell surface and secreted glycoproteins may also contain conventional or unusual N-linked glycans and/or novel O-linked glycans and/or novel phosphate-linked glycans. In addition, intracellular storage polysaccharides in some parasites are proving to be unusual in their structure and assembly.

Michael Ferguson's (University of Dundee, U.K.) presentation will be on the structure and assembly of the cell surface of trypanosomes. The structural variation in parasite glycoconjugates, and their central roles in parasite survival and infectivity presents major challenges for the future. Bioinformatics is playing a major role in mining parasite DNA databases for putative glycosylation genes and pathways and is allowing functional glycomics studies via gene knockouts and RNAi experiments.

John Samuelson's (Boston University) presentation will address what protists tell us about the evolution of N-linked glycosylation. Several of the parasite glyconconjugate biosynthetic pathways have been validated as drug targets. Structural biology and chemical biology approaches to anti-parasite drug development are ongoing. Malcolm McConville's (University of Melbourne, Australia) presentation will address the glycobiology of Leishmania - glycan biosynthesis and virulence in the mammalian host.

Protein-Glycan Functional Interactions

The existence of a vast array of glycan structures provides the cell and the organism with opportunities for implementing important biological func-

tions. This session will focus on how the information encoded within glycans is recognized and deciphered by carbohydrate-binding proteins - "lectins", and will highlight examples of protein-glycan interactions in the secretory pathway. Asn-linked glycans act as maturation and quality control tags in the endoplasmic reticulum (ER). There are several players in the quality control of glycoprotein folding. These include the folding sensor that adds a glucose unit to species not displaying their native structure (UDPGlc:glycoprotein glucosyltransferase, GT), the enzyme that removes those residues (glucosidase II), as well as the lectins that recognize the monoglucosylated glycans (calreticulin/calnexin).

Dr. Carlos Hirschberg

Armando Parodi (Fundacion Instituto Leloir, Buenos Aires, Argentina) will describe his work concerning the structure-function relationships in this group of enzymes. Daniel Hebert (University of Massachusetts-Amherst) will discuss how GT works in concert with calnexin, calreticulin and sorting receptors to assist in the maturation and quality control on nascent glycoproteins within the ER. Nancy Dahms (Medical College of Wisconsin) will talk on " building a lysosome: a story of sweetness and diversion". She will present her work on the mechanism by which the two mannose 6-phosphate receptors (CD-MPR and CI-MPR) function as lectins to deliver newly synthesized lysosomal enzymes from the secretory pathway to lysosomes.

Extracellular Matrix Function

Cell Contact with extracellular matrix is critical for the terminal differentiation of many cells. In the peripheral nervous system terminal differentiation and myelination by Schwann cells requires contact with basal lamina matrix of a specific molecular composition. David Carey (Weis Center for Research) will describe data showing critical roles of interactions between membrane anchored heparan sulfate proteoglycans and heperan sulfate-binding extracellular matrix proteins during myelin assembly. The consequences of cell contact with extracellular matrix are dependent on the structure of the matrix.

Jean Schwarzbauer (Princeton University) will discuss the mechanism of fibronectin fibril formation. This process depends on interactions between fibronectin and integrin receptors that activate critical downstream signaling cascades. Experiments with cells growing on defined three-dimensional matrices have identified regulatory roles for the cellular microenvironment and requirements for specific intracellular signaling molecules during fibronectin matrix assembly.

Joanne Murphy-Ullrich (University of Alabama-Birmingham) will discuss the functions of matricellular proteins such as thrombospondins (TSP) 1 and 2, tenascin-C, and SPARC. These proteins signal through distinct receptors, but induce a common phenotype known as the intermediate adhesive state, characterized by restructuring of focal adhesions and loss of stress fibers. TSP increases cell motility and activates anti-apoptotic signals. Thus, matricellular proteins regulate key processes of tissue remodeling during development and wound healing, with implications for tumor metastasis.

Chemical Genetics and Drug Discovery

Organizers: Chaitan Khosla, Stanford University, and Kevan Shokat, UCSF and HHMI.

Chemical Genetics, which refers to the study of biological mechanisms using chemical tools and principles, has emerged as a distinct field at the interface of biology and chemistry. Although the fundamental focus of the field is on understanding biological phenomena, it has direct relevance to practical pursuits, most notably drug discovery. This symposium seeks to highlight some of the rapidly expanding frontiers in Chemical Genetics. The four symposia of this theme will cover topics of small molecule tools for biology, elucidation of new targets for drug discovery, identification of improved next-generation therapeutic agents, and antibiotic biosynthesis.

Small Molecule Tools for Biology

Chair: Tom Kodadek, UT Southwestern

Although small molecules have frequently played a critical role in biological studies for most of the 20th century, the genomics revolution has spawned an urgent need for such reagents. At the same time new synthetic methods have facilitated rapid emergence of large, diverse libraries of chemicals as well as efficient structural variations of biologically active molecules. This symposium seeks to illustrate the power of small molecule tools in modern biological science. Tarun Kapoor from Rockefeller University explores the biology of cell division using novel small molecule agents and real-time multi-dimensional microscopy. Linda Hsieh-Wilson from Caltech integrates organic chemistry with neurobiology to explore the chemical basis of brain processes such as neuronal growth and communication. Tom Kodadek from University of Texas Southwestern Medical School has been developing small molecule tools for proteomics, most notably for elucidating the architecture of multiprotein complexes in cells.

New Targets for Drug Discovery

Chair: Carolyn Bertozzi, UC Berkeley and HHMI

The sequencing of the human genome as well as the genomes of many human pathogens has led to explosive growth in the identification of novel macromolecular targets for therapeutic intervention. Chemistry is playing an increasingly important role in not just lead identification and optimization but also in target validation. This symposium will highlight some of the challenges encountered in small molecule approaches to interrogate new molecular targets for therapy. Jeffery Kelly at Scripps discovers and analyzes small molecules that modulate protein translation, protein folding and protein degradation. Their work has implications for the treatment of a variety of amyloid diseases. James Wells, who recently moved from Sunesis Pharmaceuticals to UCSF, explores the science and technology of drug discovery especially as it pertains to therapeutically important protein-protein interactions. Carolyn Bertozzi at UC Berkeley investigates the potential utility of chemically altered carbohydrates in the diagnosis and treatment of cancer and in fundamental studies of glycopathology.

Dr. Chaitan Khosla

Dr. Kevan Shokat

Next Generation Therapeutics

Chair: Stephen Friend, Merck

In addition to breaking new clinical ground, prototypical drugs have a profound impact on biochemical and pharmacological investigations into disease pathogenesis. These fundamental investigations in turn spawn the discovery of superior next-generation therapeutic agents. For example, although tubulin binding agents have been a rich source of anticancer agents such as taxol and the vinca alkaloids, the pharmacological attractiveness of cytoskeletal proteins is only just beginning to be appreciated. Timothy Mitchison at Harvard Medical School discovers and studies drug-like small molecules that target innovative steps in cytoskeletal regulation. Kevan Shokat's research is focused on the discovery of new ligands for modulating signal transduction in cells. Stephen Friend and his colleagues at Merck use DNA chips to

study the effects of old and new drugs on cells with the goal of not just expanding the range of available drugs but also optimizing therapy for individual patients.

Biosynthesis of Complex Molecules

Chair: Chaitan Khosla, Stanford

Complex natural products such as antibiotics represent the pinnacle of synthetic elegance and biological activity. They have provided the inspiration for development of much of modern synthetic organic chemistry. At the same time many pivotal cellular processes have been elucidated as a result of the discovery of antibiotics with novel biological effects. Yet, for most of the 20th century, the biosynthesis of these molecules has remained a mystery. The application of molecular genetics has changed that over the past two decades. Suzanne Walker from Harvard Medical School will discuss how microorganisms make complex carbohydrate bearing structures such as peptidoglycan and glycosylated macrolide antibacterials. Robert Stroud from UCSF will present insights into the structural biology of polyketide synthases responsible for antibiotic biosynthesis. Chaitan Khosla investigates the biosynthetic mechanisms of polyketide synthases with the concomitant goal of providing new tools for the natural product medicinal chemist as well as for expanding the repertoire of natural product libraries.

ASBMB Reminiscences

As part of our Centennial Celebration, we recently asked members to contribute reminiscences of their early thoughts about becoming a scientist, their experience as postdocs, their first paper published, their first lecture at an ASBMB Meeting, the friendships and connections they formed with other ASBMB members, their impressions of the first ASBMB meeting they attended, and anything else they thought pertinent. Here is the first such contribution received. We believe you will find it interesting, and we look forward to receiving and publishing more reminiscences. Please send to them to editor@asbmb.org.

Dr. Christopher K. Mathews, Distinguished Professor Emeritus, Department of Biochemistry and Biophysics, Oregon State University

My first JBC paper was published as the result of an "introductory" problem suggested by my Ph.D. adviser, Frank Huennekens, when I began work in his lab in 1959. Dihydrofolate reductase had recently been discovered, and he suggested using it for preparative-scale synthesis of the biological stereoisomer of tetrahydrofolate. The project went smoothly, including my one and only use of a polarimeter. After eight or nine months, I presented the data to Frank, thinking that I could now move on to something important. Frank looked excited, and within a week he had completed a manuscript that was published in the JBC in November 1960. To my surprise, I have seen citations to that paper as recently as the past couple of years.

My first "lecture" at an ASBMB meeting was actually a ten-minute talk at an ASBC meeting, part of an Atlantic City Federation meeting, in April 1961. In the years before poster sessions, the meeting consisted of multiple simultaneous sessions, each broken into 15-minute blocks—10 for the talk, 5 for discussion. I wanted to attend the meeting so that I could meet with three prospective postdoctoral mentors, and presenting a paper was a requirement for being sent from as far away as Seattle. However, our first child was expected the previous week. When the abstract submission deadline arrived, I swallowed hard and sent one in, guaranteeing my absence from home at what might have been a critical time. Fortunately, our son arrived on the scheduled date, we had lots of help from both new grandmothers, and I was able to get away long enough to give my talk and be interviewed by three distinguished scientists.

Genome Dynamics: Replication, Repair and Recombination

Organizer: Laurie S. Kaguni, Michigan State University

Our view of DNA as the genetic blueprint of the cell has expanded greatly in recent years with a new understanding of the diversity of genome dynamics. This theme will explore mechanisms and regulation of DNA replication, and cellular strategies for maintaining genetic integrity and imparting diversity via DNA repair and recombination. Research representing a dual focus on protein machines and DNA sequence and structures will draw from cellular, mitochondrial and viral systems. A novel session on inhibitors of DNA transactions will provide a link to the theme on Chemical Genetics and Drug Discovery. Invited speakers will present biochemical, genetic and structural strategies to address current problems, and each session will be expanded by the selection of three additional speakers from submitted abstracts. The theme will also include an interactive poster session and an informal reception to provide forums for lively scientific and social exchange among participants at all levels.

Replication Assemblies and Mechanisms

The diversity of DNA replicases and replication mechanisms will be highlighted in this symposium chaired by Dr. Laurie Kaguni. Kaguni will discuss the mitochondrial replisome and its striking parallels with the bacteriophage T7 replication system, to be described by Dr. Charles Richardson in his Opening Lecture as the recipient of the Herbert Tabor/ JBC Award. Dr. Nancy Nossal (NIH) will present her studies on the architecture and function of the phage T4 replication fork, which represents an important model of cellular systems. Dr. John Kuriyan (UC Berkeley, HHMI) will provide a structural view of the function of sliding clamps and clamp loaders in processive DNA replication.

Origins and Regulation

DNA replication is tightly controlled at the level of initiation at origins, and also by checkpoints enabling a variety of repair processes before reinitiation. Dr. Joyce Hamlin (Univ. Virginia) will chair this symposium and present her pioneering research on the complex structure of mammalian origins. Dr. David Clayton (HHMI) will discuss new approaches to the study of replication of mammalian mitochondrial DNA. Dr. Anindya Dutta will describe the process of replication initiation and its regulation in normal and cancer cells.

Inhibitors of DNA Transactions

The interface between basic and applied biochemistry will be explored in this symposium chaired by Dr. Eddy Arnold (Rutgers). Dr. Arnold will present his innovative approach to confronting anti-AIDS drug resistance by targeting the polymerase and RNase H activities of HIV-1 reverse transcriptase. Dr. Charles McHenry (Univ. Colorado Health Sciences Center) will present a novel chemical genetic approach using multiplicative target screens to identify inhibitors of bacterial DNA replication. Dr. Gregory Verdine (Harvard) will discuss a structural approach to study base excision repair.

Dr. Laurie Kaguni

Genome Stability and Diversity: Repair and Recombination

Genome management and manipulation will be the focus of this symposium chaired by Dr. Samuel Wilson (NIEHS). Dr. Wilson will extend the discussion of excision repair in a presentation describing its strategic regulation through structural and chemical biology. Dr. Nancy Craig (Johns Hopkins, HHMI) will discuss the dynamics of transposable elements, and Dr. Dale Wigley (London Research Institute) will present his research on the structure and mechanism of the bacterial recombination machine RecBCD. The symposium will be preceded by a plenary lecture by Dr. James Berger (UC Berkeley), who is the recipient of the 2006 Schering-Plough Research Institute Award.

Charles Richardson to Receive Herbert Tabor/JBC Award

Charles C. Richardson has been selected to receive the 2006 Herbert Tabor/*Journal of Biological Chemistry* Lectureship Award. This award will be conferred at the 2006 ASBMB annual meeting, which also marks the centennial of ASBMB and its foundation publication, the *Journal of Biological Chemistry*. The meeting will be held in conjunction with Experimental Biology, April 1-5, 2006 in San Francisco, and the Herbert Tabor/JBC Lecture will open the meeting on Saturday, April 1 at 7 p.m.

The Lectureship was established in recognition of the many contributions of Herbert Tabor to the *Journal of Biological Chemistry* and the Society. The award honors the conferee with a cash prize as well as paid travel and expenses to present a lecture at the 2006 meeting. Past recipients of the award were Robert J. Lefkowitz in 2004, and Michael S. Brown and Joseph L. Goldstein in 2005.

Richardson, Professor in Harvard Medical School's Department of Biological Chemistry and Molecular Pharmacology, has been a pioneer in the area of DNA replication for over 40 years, and continues to publish seminal work today. As an acknowledged leader in the field, he has been a member of the National Academy of Sciences since 1983. He served two terms on the Editorial Board of the *JBC*, and two terms on the Nominating Committee of the ASBMB. He has also served as Associate Editor/Editor of the *Annual Review of Biochemistry* for over 30 years!

The Richardson Lab's goal is to understand molecular mechanisms that mediate the multiple reactions required for the replication of a chromosome. The lab combines structural studies of the proteins, their functional subassemblies, and the replisome itself, with genetic and biochemical analyses of the reactions they mediate. An essential component is defining the protein-protein interactions that coordinate the individual steps of replication.

Background

In recent years considerable progress has been made in understanding the reactions catalyzed by the proteins of DNA replication. However, many questions remain concerning the function of individual proteins, aside from the more complex processes of initiation of replication at chromosomal origins and the coordination of events at a replication fork.

Even in the case of DNA polymerases, where the wealth of enzymatic data gathered over the years can now be interpreted in light of the three dimensional structures of the proteins, questions pertaining to the basis of nucleotide selection and the coordination of proofreading with polymerization remain. Likewise, the mechanism of unidirectional movement of the DNA helicase on a DNA strand and the unwinding of the duplex are unsolved. Also in need of additional characterization are the DNA primases, an intriguing class of enzymes whose zinc motif plays an essential role in sequence recognition.

Even single-stranded DNA binding proteins, often relegated to mundane roles, are emerging as key components in coordinating reactions at origins and replication forks. More complex are the interactions of the helicase and primase with one another and their interaction, in turn, with the polymerase where helicase and polymerase movement must be coordinated and primers transferred to the polymerase. Least well understood are the coordination of leading and lagging strand synthesis and the recycling of the polymerase from one Okazaki fragment to a new primer.

Dr.Charles Richardson

The Bacteriophage T7 Replication System

In order to address these questions of DNA replication the Richardson laboratory has focused on the replication system derived from *Escherichia coli* infected with bacteriophage T7. The T7 chromosome is replicated in a fashion characteristic of more complex bacterial and eukaryotic systems. Initiation of replication occurs at a primary origin, replication is bi-directional, and lagging strand DNA synthesis is dependent on multiple initiation events.

Consequently, T7 DNA replication requires a processivity factor (*E. coli thioredoxin*) for the DNA polymerase (T7 gene 5 protein), a helicase-primase (T7 gene 4 protein), a single-stranded DNA binding protein (T7 gene 2.5 protein), and other accessory proteins such as a 5′ to 3′ exonuclease (T7 gene 6 exonuclease) and a DNA ligase (T7 gene 1.3 protein). T7 has evolved an efficient and economical mechanism for the replication of its DNA, one that probably defines the minimal require-

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More Women Receive Ph.D.'s, But Female Senior Faculty Still Rare

Despite gains over recent years in the number of women who receive Ph.D.'s in science and engineering fields, a relative few go on to assume high-level faculty positions. Writing in the August 19 issue of the journal *Science*, several top women scientists and university administrators attributed the imbalance to four pervasive elements:

- small numbers of women in the faculty pipeline
- a hostile or "chilly" campus climate toward women junior faculty
- unconscious bias that results in covert discrimination
- sacrifices to balance family and work

"While we as a nation have made considerable progress in attracting women into most science and engineering fields, we still see fewer women at the full-professor and academic leadership levels than we would expect..." said Alice Hogan, director of the National Science Foundation's (NSF) ADVANCE program, which aims to increase the representation and advancement of women in academic science and engineering careers.

"After investing in creating this pool of highly trained talent," she added, "we should see a high rate of return—productive, creative and respected teachers and researchers attracting more students into fields that might have seemed closed to them given the traditional profile of science and engineering faculty."

Lead author Jo Handelsman, Professor of Plant Biology at the University of Wisconsin-Madison, and her colleagues focused on the "cultural issues that manifest in the behavior of individuals and the policies of institutions because these factors make a difference and can be changed."

The article identified results from participants in the ADVANCE Institutional Transformation Program, which the authors say "appear to work."

To address the pipeline shortage, for example, Georgia Tech Engineering and ADVANCE Professor Jane Ammons, has developed a "speed mentoring" workshop, in which junior faculty consult for 15 to 20 minutes with experienced, tenure-case reviewers to learn ways to strengthen their odds with tenure committees.

Meanwhile, the University of Michigan's ADVANCE program hosts workshops that include an interactive theater program that portrays typical academic situations, such as hiring, retention, and climate for women faculty in the sciences and engineering, to raise awareness of personal thoughts and behaviors that affect the campus climate toward women faculty.

Workshops at UW-Madison train members of search committees in good search methods and sensitize the participants to bias.

Although systematic examination and critique of pipeline problems, campus climate, unconscious bias and work-family juggling can be "disquieting," the report says, it is necessary to create a "scientific community reflective of the pluralist society that supports it."

In addition to Handelsman, authors of the paper include Nancy Cantor, chancellor and president of Syracuse University; Molly Carnes, a UW-Madison Medical School professor and co-director of the Women in Science and Engineering Leadership Institute; Denice Denton, chancellor of the University of California at Santa Cruz; Eve Fine of the Women in Science and Engineering Leadership Institute; Barbara Grosz, Higgins professor of natural sciences, Harvard University; Virginia Hinshaw, provost and executive vice chancellor at the University of California at Davis; Cora Marrett, senior vice president of the University of Wisconsin System; Sue Rosser, dean of the Ivan Allen College of Liberal Arts at the Georgia Institute of Technology; Donna Shalala, president of the University of Miami; and Jennifer Sheridan of the Women in Science and Engineering Leadership Institute at UW-Madison.

The National Science Foundation (NSF) is an independent federal agency that supports fundamental research and education across all fields of science and engineering, with an annual budget of nearly $5.47 billion. NSF funds reach all 50 states through grants to nearly 2,000 universities and institutions. Each year, NSF receives about 40,000 competitive requests for funding, and makes about 11,000 new funding awards. The NSF also awards over $200 million in professional and service contracts yearly.

A New Look for the Journal of Biological Chemistry

In anticipation of the Journal of Biological Chemistry's Centennial, we thought it time to dress-up the old girl with a complete "makeover." JBC has been the leader in science publishing innovation, yet the appearance of the Journal had not significantly changed in over 30 years. The changes, particularly the new cover format, signal the new excitement about JBC and a fresh start for the next 100 years. While the substance of the JBC will continue to be exciting research reports, we have also added several new features that also mark the Centennial; JBC Reflections, on the careers of the world's leading biochemists; JBC Classic Papers, reprinting the most important and influential papers published in the JBC over the past 100 years; and JBC Papers of the Week, some of the most exciting papers published in each issue of the JBC.

So JBC is not your grandfather's or grandmother's Oldsmobile any longer.

Tabor/JBC Award continued ...

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ments for the rapid and faithful replication of a duplex DNA molecule.

The limited number of proteins involved in T7 replication offers two major advantages: the stoichiometry of the proteins in functional complexes is facilitated by the limited number of permutations, and a determination of the three dimensional structure of functional complexes is an achievable goal..

Several examples illustrate the simplicity of functional complexes in the T7 replication system. Thioredoxin, the processivity factor, binds to the polymerase to clamp the complex onto a primer-template. Economy dictates that the polymerase provide one-half the clamp; assembly occurs without accessory proteins, in contrast to the situation in *E. coli* and phage T4 . Similarly, the T7 gene 4 protein provides both helicase and primase activities at the replication fork whereas in other systems these activities are provided by separate proteins.

The experimental utility of a limited number of proteins is most apparent in studies on the T7 replisome. The Richardson lab has constructed a T7 replisome, consisting of only four proteins, that fulfills all of the predictions that arise from models of coupled leading and lagging strand synthesis.

Study Links Brain Fatty Acid Levels to Depression

By Nicole Kresge, Staff Science Writer

A group of researchers from Israel has discovered that rats exhibiting the signs of depression have increased levels of the omega-6 fatty acid, arachidonic acid, in their brains. The details of their findings appeared in the June 2005 issue of the *Journal of Lipid Research* (2005, 46: 1093-1096), an American Society for Biochemistry and Molecular Biology journal.

During recent years, omega-3 fatty acids have enjoyed increased popularity as numerous studies have shown that supplementing diets with fish oil (a natural source of this polyunsaturated fatty acid) does everything from reducing the risk of heart disease to preventing arthritis. There is also evidence that depression may be associated with a dietary deficiency in omega-3 fatty acids. This "phospholipid hypothesis" of depression has been supported by research showing that omega-3 fatty acid concentration in the blood of depressed patients is lower than that in control patients.

"The 'phospholipid hypothesis' of depression postulates that decreased omega-3 fatty acid intake, and hence, perhaps decreased brain omega-3 fatty acid content, could be responsible for the disease," explains Dr. Pnina Green of Tel Aviv University. "In humans, because of high dietary variability and the obvious inability to examine brain tissue, the theory is backed up mainly by indirect evidence. The availability of the Flinders Sensitive Line rat, an animal model of depression, overcomes both these obstacles."

In the *Journal of Lipid Research* study, Dr. Green in collaboration with Dr. Gal Yadid of Bar-Ilan University, Ramat Gan,

used the Flinders Sensitive Line rats to investigate the link between omega-3 fatty acids and depression. They examined the brains of the depressed rats and compared them with brains from normal rats. Surprisingly, they found that the main difference between the two types of rats was in omega-6 fatty acid levels and not omega-3 fatty acid levels. Specifically, they discovered that brains from rats with depression had higher concentrations of arachidonic acid, a long-chain unsaturated metabolite of omega-6 fatty acid.

Arachidonic acid is found throughout the body and is essential for the proper functioning of almost every body organ, including the brain. It serves a wide variety of purposes, from being a purely structural element in phospholipids to being involved in signal transduction and being a substrate for a host of derivatives involved in second messenger function.

"The finding that in the depressive rats the omega-3 fatty acid levels were not decreased, but arachidonic acid was substantially increased as compared to controls is somewhat unexpected," admits Dr. Green. "But the finding lends itself nicely to the theory that increased omega-3 fatty acid intake may shift the balance between the two fatty acid families in the brain, since it has been demonstrated in animal studies that increased omega-3 fatty acid intake may result in decreased brain arachidonic acid."

Although far less attention has been paid to dietary requirements for omega-6 fatty acids, which can be found in most edible oils and meat, perhaps in the future depression may be controlled by increasing omega-3 fatty acid intake and decreasing omega-6 fatty acid intake.

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.

Weihong Hou
Medical College of
Zhengzhou University

Guofun Zhao
University of Tennessee, Knoxville

* Candidates with an asterisk were previous Associate members who met the requirements for a free one-year membership.

New Understanding of DNA Repair May Pave Way to Cancer Treatments

A Burnham Institute study has found that a protein known for its role in gene regulation has another important function, that of initiating DNA repair. The study, published in the May 27, 2005 edition of *Molecular Cell,* points to new targets for the treatment of cancer.

Ze'ev Ronai,* Director of the Institute's Signal Transduction Program, and his colleagues found that the protein ATF2 (Activating Transcription Factor-2) is activated by a protein kinase called ATM (Ataxia-Telangiectasia Mutated), which stimulates DNA repair. ATF2's role in regulating expression of proteins that control cell cycle and programmed cell death is well established. The current study is the first to demonstrate ATF2's role in DNA repair, an intracellular process that prevents formation of genetic mutations, including those that lead to cancer.

"This is the first time we've seen a protein which has been implicated in gene regulation possess an independent function—in DNA repair—while both functions are independent from one another," said Ronai. Dr. Ronai's laboratory has been studying ATF2 with the goal of understanding its role in regulation of cell cycle and programmed cell death. These studies evolved from the finding that ATF2 has an important role in the development and progression of melanoma tumors. Inhibition of ATF2 was found to sensitize melanoma to various treatments, both in tissue culture and in animal models.

"Melanoma is usually resistant to chemotherapy, but we found that by inhibiting ATF2, it became more sensitive to treatment," Ronai said. Consequently, his laboratory developed a small peptide that interferes with ATF2 function, efficiently blocking melanoma growth in mouse models. Ongoing studies are devoted to screening for compounds that mimic the peptide's actions and to allow for further development of the peptide toward clinical assessment.

"Until our recent studies, we were certain that the mechanism by which ATF2 affects melanoma growth was primarily through its established function in the regulation of proteins important in cell cycle and cell death control. We were therefore most surprised to find an uncoupled function for the same protein," said Ronai.

The finding of ATF2's novel function in DNA repair was serendipitous. As Shoichi Takahashi, a postgraduate researcher, was testing for the changes in ATF2 in human cancers, he "lost the signal" for ATF2. "Later," Dr. Ronai said, "we did experiments that showed the signal was lost because a protein kinase, ATM, modified ATF2 enough to interfere with detection of the ATF2 signal. Soon, work performed by Anindita Bhoumik confirmed that ATF2 is regulated by ATM and that this regulation is central to the cell's ability to initiate DNA repair processes following ionizing irradiation or other exposures that cause breaks in DNA. A likely way in which ATF2 works is to halt the cell's cycle to allow repair of damaged DNA before such damage results in mutation."

Ronai and his colleagues are now determining how molecules like ATF2 can balance their dual roles. "High doses of radiation, as well as changes that take place in cancer and pathologic situations, can activate both functions of ATF2, which is expected to disturb the otherwise conserved balance between its role in gene regulation and the DNA damage response. We need to find out which of the two functions is more dominant under these circumstances in order to devise ways to regain the proper balance," he said.

The Ronai lab's work on ATF2 was started at Mount Sinai School of Medicine in New York City, from which Dr Ronai and his colleagues recently relocated to the Burnham Institute. This study was carried out in collaboration with Wolfgang Breitweiser and Nic Jones of the Paterson Institute for Cancer Research, Manchester, England, and Yosef Shiloh, of Tel Aviv University, Israel. The study was supported by a grant from the National Institutes of Health.

**ASBMB Member*

by John D. Thompson, Editor

Oklahoma City Unveils Regional Strategic Bioscience Plan

More than 7,000 new jobs and nearly 90 new businesses could be created over the next 10 years if all the plans in a Regional Bioscience Strategic Plan unveiled last month by the Greater Oklahoma City Chamber come to fruition.

The Chamber hired Battelle's Technology Partnership Practice, a worldwide leader in research and development activity with more than 1,000 clients and 4,500 projects annually, to help develop the plan. The Chamber also worked with a Steering Committee of more than 20 science and business leaders in the region during the course of the nine-month project.

"We discovered that our region has some very strong pockets of scientific research, a growing foundation of bioscience companies and state-of-the-art facilities with room for expansion that many larger markets don't have access," said Greater Oklahoma City Chamber President and CEO Roy Williams. "Our potential for continued success in bioscience is great; however, we must create new resources as well as better leverage our existing assets to realize this potential."

The Oklahoma City project seeks to diversify the region's economic base, provide high-end, well paying jobs and contribute to the overall economic productivity. In 2003, the bioscience industry paid more than $15,000 above the average annual wage for the region. All 14 action items revolve around four proposed strategies to take the region's bioscience cluster to the next level:

- Build the region's bioscience Research and Development base and encourage commercialization of bioscience discoveries;
- Develop and attract bioscience talent to the region;
- Grow a critical mass of bioscience companies by creating an environment in which such firms can start, grow and prosper;
- Build a bioscience image and market the region.

More than 100 scientists, business people and service providers were interviewed for the strategic plan. In addition to the interviews, there was extensive economic research, focus group sessions, benchmarking against six comparable markets, identification of key scientific strengths and recommended strategies, actions and funding items for future implementation.

Battelle discovered that 99% of the research and development in biosciences in Oklahoma occurs along the Interstate 35 corridor extending from Stillwater in the north, through the Oklahoma City area to Ardmore in the south. Chamber officials brought in Battelle to help define the region, identify partners and target potential collaborators.

Walter Plosila, Vice President for Battelle, said the Greater Oklahoma City region has several important building blocks for success in biosciences. "There are first-rate facilities at the Presbyterian Health Foundation Research Park; there are quality scientists at University of Oklahoma Health Sciences Center, Oklahoma Medical Research Foundation, Oklahoma State University, Noble Foundation and the University of Oklahoma in Norman; and the state has model service providers like the Oklahoma Center for Advancement of Science and Technology and i2E (Turning Innovation into Enterprise)."

Oklahoma City Not Alone In Hunt for Biotech Business

Market capitalization of biotechnology in the United States grew 17% last year and states across the country are investing significant dollars in bioscience. Following are just a few recent entries in what might be called the Biotech Sweepstakes.

- Iowa has started a 10-year, $500 million Grow Iowa Values fund, which includes Biosciences;
- Kansas has the Kansas Economic Growth Act, a $500 million, 10-year investment to encourage biotechnology and entrepreneurship;
- In Washington, $350 million will be allocated over a 10-year period beginning in 2008 to a Life Sciences Discovery Fund to grow the bioscience industry and ensure competitiveness of its research institutions;
- Wisconsin has developed a 10-year, $375 million plan for an Institute for Discovery in Madison.

Sales of Biogenerics in US,

Copies of expensive biotech drugs could hit $16.4 billion in sales in the United States and Europe by 2011 once regulatory curbs on so-called biogenerics use are gone, according to a study released in early September..

The study by the global consulting group Frost & Sullivan noted that traditionally, biotech drugs made using genetic engineering have been immune from generic competition, since regulators in these major markets have been slow to set clear approval rules and many are still patent-protected. However, the Frost & Sullivan study's analysis found that the outlook for biogenerics is fast improving.

"As regulatory guidelines are introduced over the next two to three years and some of the biggest biopharmaceutical blockbusters lose patent protection, the biogenerics

Boston, San Francisco, Philadelphia Top Life Sciences Clusters in U.S.

If the life sciences industry is the holy grail of economic development, as many public policy officials believe, then Boston, Greater San Francisco, Greater Philadelphia and Greater New York are in the best position to gain from this dynamic industry in the years to come. The four regions ranked at the top of the Milken Institute's Life Sciences Index, a measure of not only the current strength of these clusters, but their growth potential.

"The life sciences industry is an emerging powerhouse for U.S. global economic competitiveness in the 21st century," says Ross DeVol, Director of Regional Economics at the Milken Institute and principal author of the report.

The report, *The Greater Philadelphia Life Sciences Cluster: An Economic and Comparative Assessment,* compares Greater Philadelphia to 10 other metropolitan areas considered the leading life sciences clusters in the U.S. and ranks them based on employment, output, workforce, investment and dozens of other measures. Following is the Milken Institute Life Sciences Composite Index ranking (with scores):

1. Boston (100)
2. Greater San Francisco (98.4)
3. Greater Philadelphia (97.1)
4. Greater New York (94.6)
5. Greater Raleigh-Durham (91.1)
6. San Diego (90.7)
7. Greater Los Angeles (87.0)
8. Minneapolis (77.9)
9. Chicago (75.9)
10. Seattle (70.9)
11. Dallas (55.2)

The core life sciences industry—which includes biotechnology, pharmaceuticals, medical devices and research and development in life sciences—is sought after by local economic development organizations across the country for its high-paying jobs and tremendous growth potential based on expected pending breakthroughs in medical research and an aging baby boomer population.

Institute researchers used more than 60 core measurements to create the Life Sciences Composite Index. The main criteria (both weighted 50 percent) were the Institute's Innovation Pipeline, which measures the assets that allow a metro to capitalize on its life sciences knowledge and creativity, such as the quality of its workforce; and Current Impact Assessment, which measures an area's success in bringing research ideas to the marketplace and creating companies, jobs and products.

Among the findings:

On the Innovation Pipeline Index, Boston placed first, followed by Greater San Francisco, Greater Philadelphia and San Diego.

On the Current Impact Assessment, Philadelphia placed first, followed by New York, San Francisco and Boston.

New York employed the most life sciences workers of the 11 clusters (74,592 in 2003), followed by Philadelphia (53,479), Greater Los Angeles (51,533) and San Francisco (46,593).

Life sciences employment (relative to the national average) grew fastest from 1997 to 2003 in Greater Raleigh Durham (19.3% above the national average), followed by Philadelphia (+ 9.3%) and Minneapolis (+ 0.6%).

Within the Current Impact Assessment, the leaders in the four main industries studied were Philadelphia (pharmaceuticals), Minneapolis (medical devices), Raleigh Durham (biotechnology) and San Diego (life sciences R&D).

Supporting industries such as hospitals and medical schools employed more than 912,000 workers in New York in 2003, the most of any of the clusters measured. Los Angeles was second with more than 472,000 and Chicago third with over 395,000.

The report also includes a section on the so-called "multiplier impact" of the life sciences industry on the broader Philadelphia economy. According to the study, life sciences is responsible for $15.5 billion (7.1 percent) of the region's gross metro product, $6.9 billion directly and $8.6 billion from the economic impact in other industries.

In addition to highlighting many of Philadelphia's strengths, the study also pointed out opportunities for improvement, such as increasing support for life sciences startup firms through greater availability of risk capital and a stronger support infrastructure.

Europe Expected to Soar

market is expected to see exceptional growth and rapidly reach billion-dollar levels," said Frost & Sullivan analyst Himanshu Parmar.

Generic drug makers are keen to tap into the market by producing cheaper versions of products such as human growth hormone, transgenic insulin and erythropoietin (EPO), the "blood boosting" medicine.

Frost & Sullivan said products like these could reach markets in North America and Europe by 2006-07 and potentially generate sales of $16.39 billion by 2011.

Although no generic version of a biotech medicine has yet been approved, Europe is further ahead than the United States in the matter, having already established a legal framework for "biosimilar" drug applications.

IOM Sees Flaws in Protection Against Bioterrorism Agents

The system for intercepting microbial threats at the nation's airports, seaports, and borders needs strategic leadership and a comprehensive plan to meet the challenges posed by emerging diseases and bioterrorist threats, says a new report from the Institute of Medicine of the National Academies. The report recommends that the Centers for Disease Control and Prevention, particularly its Division of Global Migration and Quarantine and individual quarantine stations at U.S. ports of entry, should have the responsibility, authority, and resources to lead the effort to protect the public from microbial threats.

"CDC quarantine stations and the broader quarantine system serve as the nation's insurance policy against catastrophes that might arise from the importation of naturally occurring infectious agents, such as the SARS virus, or man-made threats like an attack using a dangerous biological agent," said Georges Benjamin, executive director of the American Public Health Association and chair of the committee that wrote the report. "No single entity currently has the responsibility, authority, and resources to orchestrate all the activities of the quarantine system, and the traditional responsibilities of quarantine personnel are no longer sufficient to meet the challenges posed by the rapidly increasing pace of global trade and travel and the emergence of new microbial threats. Consequently, we recommend the establishment of clear leadership and lines of communication among all parties involved in protecting the public from infectious agents that originate abroad."

Every year, roughly 120 million people travel into or out of the country through the nation's 474 airports, seaports, and land-border crossings. In 2003 Congress began to allocate funds to bring the number of quarantine stations from eight to 25. The 25 cities that would comprise the expanded quarantine station system together receive more than 75 million international travelers and immigrants annually and 31% of the cargo imported by sea. Currently, just11 quarantine stations staffed by CDC personnel are fully active in major points of entry.

A national strategic plan devised by CDC quarantine personnel is needed to provide the best possible framework for protecting the public from the importation of dangerous biological agents, the committee concluded.

The ASBMB/Centennial Clara Benson Travel Fellowship Award

In honor of the Centennial Celebration of ASBMB and the Journal of Biological Chemistry

The ASBMB has established five travel fellowships in honor of Clara C. Benson, the only woman in the group of 81 scientists who founded the American Society for Biological Chemists in December, 1906. The fellowships will be awarded to female biochemists and molecular biologists in the early stages of their careers (postdoctoral fellows and junior faculty members or scientists not more than five years after the date of PhD graduation). Nominees will be selected based on their scientific contributions to biochemistry and molecular biology, and their potential for continuing a high level of scientific endeavor. The travel fellowship recipients will receive a plaque and up to $2,500 towards their travel expenses to attend the ASBMB Centennial Meeting in San Francisco, to include travel, hotel, meals and Early-bird meeting registration.

To nominate a candidate for the Clara Benson Travel Fellowship Award the following materials must be uploaded as MS Word or PDF files at the Travel Award section of the ASBMB Annual Meeting and Centennial webpage, **www.asbmb.org/meetings**.

- A brief statement providing the focus of the nominee's research
- A copy of the nominee's successfully submitted abstract
- The nominee's CV
- A signed letter of recommendation, on institution letterhead, from the nominee's department chair or mentor
- Two additional signed letters of support, on institution letterhead, at least one of which must come from outside the nominee's current institution

All nominations must be received no later than Friday, October 21, 2005.

GENETIC ANALYSIS: Model Organisms to Human Biology

Genetics Society of America

GSA MEETING

January 5-7, 2006

San Diego, California

Growth, Differentiation and Cancer:
Co-Chairs
Steve Elledge, Charles Sherr

SPEAKERS
Steve Elledge, Vicki Lundblad, Titia de Lange, Iswar Hariharan

Gene Interactions and Unraveling Complex Traits:
Co-Chairs
Aravinda Chakravarti, Chuck Langley

SPEAKERS
Aravinda Chakravarti, Allen Orr, Trudy Mackay, Peter Donnelly

New Insights in Epigenetic Phenomena:
Co-Chairs
Art Beaudet, Barbara Meyer

SPEAKERS
Barbara Meyer, Vicki Chandler, Steve Henikoff, Art Beaudet

Stem Cell Genetics:
Co-Chairs
Judith Kimble, Janet Rossant

SPEAKERS
Judith Kimble, Janet Rossant, Allan Spradling, Liheng Li

Neurological Diseases:
Co-Chairs
Susan Lindquist, Jeremy Berg

SPEAKERS
Susan Lindquist, Li Hui Tsai, Mario Capecchi, Cynthia Kenyon

Comparative Genomics:
Co-Chairs
Maynard Olson, Eric Green

SPEAKERS
Eric Green, Bill Gelbart, David Kingsley, Richard Durbin

Technology:
Chair
Stan Fields

SPEAKERS
George Church, Ron Davis, Lee Hood

Keynote Speakers:
Paul Nurse
Mary-Claire King
Sydney Brenner

Two poster sessions
PLUS additional speakers
chosen from abstract submissions!

Sign up for this meeting at
www.GSA-MODELORGANISMS.org

Calendar of Scientific Meetings

OCTOBER 2005

Supramolecular Chemistry

October 14-19 • Obernai (near Strasbourg), France
A European Science Foundation conference. For information:
Ph: +33 (0)3 88 76 71 35; Fx: +33 (0)3 88 36 69 87
Email: conferences@esf.org

North Carolina RNA Society's Symposium on RNA Biology VI: RNA, Target and Tool Theme: Small RNAs and RNPs.

October 21-22 • North Carolina Biotechnology Center, Research Triangle Park, NC. 2005
Deadline for registration and abstract submission: July 1
Email: stu_maxwell@ncsu.edu.
Website: http://www.med.unc.edu/pmbb/nc-rna-soc.html

NOVEMBER 2005

International Workshop on Biosensors for Food Safety and Environmental Monitoring

November 10-12 • Agadir, Morocco
Contact: Université Hassan II-Mohammedia, Faculté des Sciences et Techniques, B.P. 146, Mohammedia, Morocco
Email a.amine@univh2m.ac.ma
Website: www.univh2m.ac.ma/biosensors

BioConferences International 6th European Biotechnology Symposium

November 13–15 • Radisson SAS Scandinavia Hotel, Copenhagen
Contacts: Aimee Burt; 800-524-6266; aburt@liebertpub.com
Nilda Rivera; 800-524-6266; nrivera@liebertpub.com
Website: www.bioconference.com/ebs/

Cambridge Healthtech Institute Second Annual Fluorescent Proteins in Drug Development

November 14–15 • Hyatt Regency La Jolla, California
Contact: Pete DeOlympio
Ph: 617-630-1359, Email: peterd@healthtech.com
Website: www.healthtech.com/2005/gfp/index.asp

Third Annual World Congress on the Insulin Resistance Syndrome Clinical manifestations of the Insulin Resistance Syndrome - Metabolic Syndrome X

November 17-19 • Palace Hotel, San Francisco
For information on registration, abstracts submission, accommodations and exhibits: Ph: 818-342-1889; Fax: 818-342-1538
Email: insulinresistance@pacbell.net
Website : www.insulinresistance.us

DECEMBER 2005

Xth PABMB Congress: Panamerican Association for Biochemistry and Molecular Biology

December 3-6 • Hotel del Bosque, Pinamar, Province of Buenos Aires, Argentina
For more information contact:
SAIB President. Ernesto Podestá: ernestopodesta@yahoo.com.ar
SAIB Secretary Carlos Argaraña: carga@dqb.fcq.unc.edu.ar, or
PABMB Chairman Juan José Cazzulo: jcazzulo@iib.unsam.edu.ar
website: http://www.saib.org.ar

2005 Congress Expanding Proteomics: New Directions in Biology, Chemistry, Pharmaceutical Sciences and Medicine

December 5-7 • Zurich, Switzerland
For information contact:
Email: sps.congress@nlight.ch; Ph: +41 21 802 1163
Website: http://sps05.swissproteomicsociety.org/qsPortal/Home.asp

Cambridge Healthtech Institute Sixth Annual Metabolic Profiling

December 7–8 • Wyndham Palace Resort and Spa
Contact: Pete DeOlympio
Ph: 617-630-1359, Email: peterd@healthtech.com
Website: www.healthtech.com/2005/gfp/index.asp

3rd Cachexia Conference

December 8-10 • Rome
For information contact:
Website: www.nataonline.com/LMS-Group/events/2/index.ph

American Society for Cell Biology Annual Meeting

December 12–14 • San Francisco
Contact: John Fleischman; Ph: 301-347-9300
Email: jfleischman@ascb.org; Website: www.ascb.org

Non-VesicularIntracellular Traffic

December 15-16 • Goodenough College, London, UK
Contact: Meetings Office, Biochemical Society, 3rd Floor, Eagle House, 16 Procter Street, London, WC1V 6NX
Email: meetings@biochemistry.org
Website:www.biochemistry.org/meetings/focused.htm

Pacifichem 2005

December 15-20 • Honolulu
For information contact: Website:www.pacifichem.org/
Email: pacifichem2005@acs.org

JANUARY 2006

Pacific Symposium on Biocomputing

January 3-7 • Wailea, Maui
For information contact: http://psb.stanford.edu/
Email: psb@helix.stanford.edu; Phone: (650)725-0659

Building Bridges, Forging Bonds for 21st Century Organic Chemistry and Chemical Biology

January 7-9 • Pune, India
Tel.: 202-872-4523; Email: t_nameroff@acs.org
Website: http://www.ncl-india.org/occb2006/index.htm

FEBRUARY 2006

The 11th Annual Proteomics Symposium

February 3-5 • Erskine on the Beach, Lorne, Australia
Email: mp@asnevents.net.au
www.australasianproteomics.org.au/lorne.htm

The 31st Lorne Conference on Protein Structure and Function

February 5-9 • Erskine on the Beach, Lorne, Australia
email: mp@asnevents.net.au; www.lorneproteins.org/

Third International Conference on Ubiquitin, Ubiquitin-like Proteins, and Cancer

February 9-11 • The University of Texas M. D. Anderson Cancer Center, Houston, Texas
This meeting will celebrate the Nobel Prize awarded to Avram Hershko, Aaron Ciechanover, and Irwin Rose for their discovery of the ubiquitin pathway and the 10th anniversary of the discovery of SUMO/Sentrin and NEDD8
Application and Abstract Submission Deadline: Friday, November 11, 2005; For information contact: Amy Heaton
Program Manager, Department Of Cardiology
University of Texas M. D. Anderson Cancer Center
Tel: 713-745-6826; Fax: 713-745-1942
Website: www.sentrin.org

ABRF 2006—Integrating Science, Tools and Technologies with Systems Biology

February 11-14 • Long Beach, California
For Information: www.faseb.org/meetings/abrf2006

G Protein- Coupled Receptors: Evolving Concepts and New Techniques

February 12-16 • Keystone, Colorado
For information contact:
Ph.: 800-253-0685 / 970-262-1230
Email: info@keystonesymposia.org
http://www.keystonesymposia.org/Meetings/ViewMeetings.cfm?MeetingID=807

MARCH 2006

Gordon Research Conference (GRC) on New Antibacterial Discovery & Development

March 5-10 • Ventura Beach Marriott, Ventura, California
For Information: Email:trevor.trust@astrazeneca.com
Website: www.grc.org/programs/2006/antibact.htm

RNAi2006: Advances in RNA Interference Research

March 22-23 • St. Anne's College, Oxford, UK
Conference Organizer: Muhammad Sohail
Biochemistry Department, University of Oxford
Tel: +44 1865 275225; Fax: +44 1865 275259
Email: muhammad.sohail@bioch.ox.ac.uk
Website: http://libpubmedia.co.uk/Conferences/RNAi2006HomeMay2005.htm

American Chemical Society 231st National Meeting

March 26 – 30 • Atlanta
Contact: Charmayne Marsh; Ph: 202-872-4445
Email: y_marsh@acs.org; Website: www.acs.org/meetings

APRIL 2006

American Society for Biochemistry and Molecular Biology Centennial Meeting in Conjunction with Experimental Biology 2006

April 1–5 • San Francisco
For information contact: www.asbmb.org/meetings
Email: meetings@asbmb.org
Ph: 301-634-7145; Website: www.asbmb.org/meetings

Recomb 2006 - The Tenth Annual International Conference on Research in Computational Molecular Biology

April 2-5 • Venice, Italy
For information contact:
Email: info@veneziacongressi.com
Ph: +39 0415238995
Website: http://recomb06.dei.unipd.it/

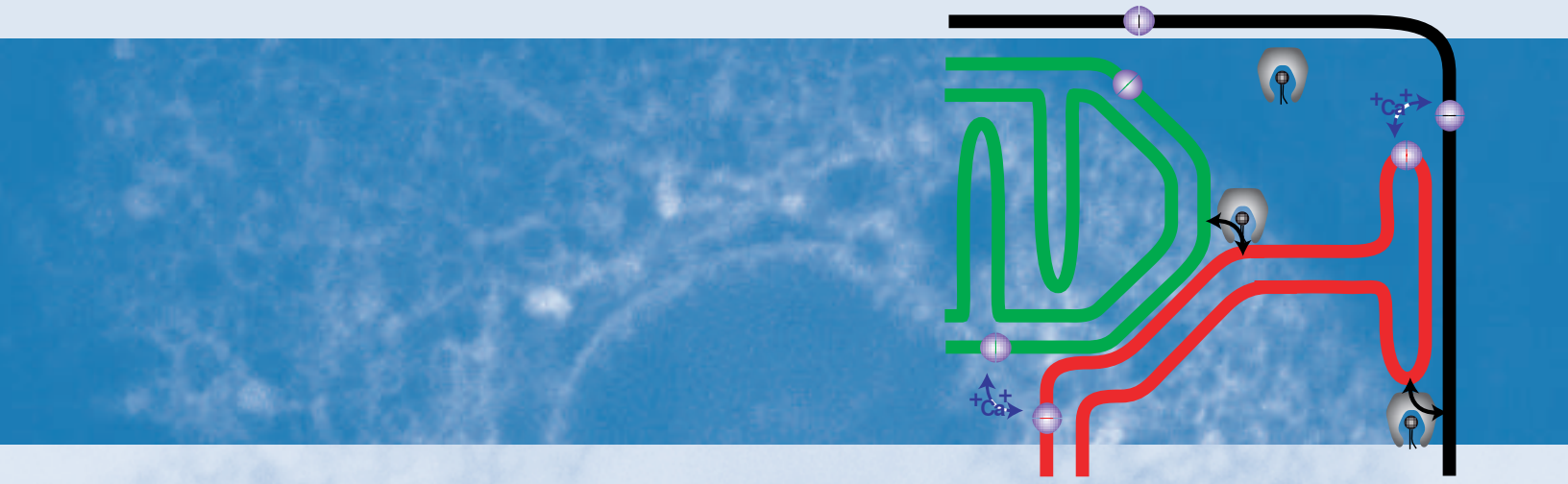
47th ENC Experimental Nuclear Magnetic Resonance

April 23-28 • Asilomar Conference Ctr., Pacific Grove, CA
Contact: ENC, 2019 Galisteo Street, Building I-1
Santa Fe, New Mexico 87505; Ph: 505-89-4573
Fx: 505-989-1073; Email: enc@enc-conference.org
Web page: http://www.enc-conference.org

Biochemical Society Focused Meeting

15–16 December 2005
Goodenough College, London, UK

Non-vesicular intracellular traffic



Intracellular traffic of material and information is of fundamental importance to cell function. While much attention has focused on transport mediated by vesicles, another highly conserved mechanism exists: non-vesicular traffic. This fulfils essential cellular functions by mediating the transport of small molecules in two major categories: lipids and calcium ions. Despite the distinct natures of lipids and calcium ions, their traffic shares one major feature: it occurs at sites where organelles come into close contact with one another. For example, lipid traffic occurs at stable, purifiable zones of contact between endoplasmic reticulum and mitochondria, and it is proposed that calcium flux also occurs in close relation to such contact sites. This two-day meeting will be the first to concentrate on the activities of these contact zones.

Talks will address traffic at zones of contact formed between different organelles, as well as proteins in particular lipid-transfer proteins, that are understood to be involved in this process.

This meeting will be published in *Biochemical Society Transactions.*

Poster Abstract Deadline
22 October 2005

Early Registration Deadline
15 November 2005

Confirmed Speakers:

Vytas Bankaitis
Christoph Benning
Peter Griac
Elina Ikonen
Sima Lev
Fred Maxfield
Anant Menon
Robert Nabi
Will Prinz
Howard Riezman
Rosario Rizzuto
Alexei Tepikin
Jean Vance
Dennis Voelker

Organizers:

Shamshad Cockcroft
Tim Levine

Fees

Include lunches and refreshments

Full member	$368
Student	$184
Non-member	$552
Biochemical Society Transactions 34(3)	$40

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www.biochemistry.org/meetings