OCTOBER 2006

www.asbmb.org

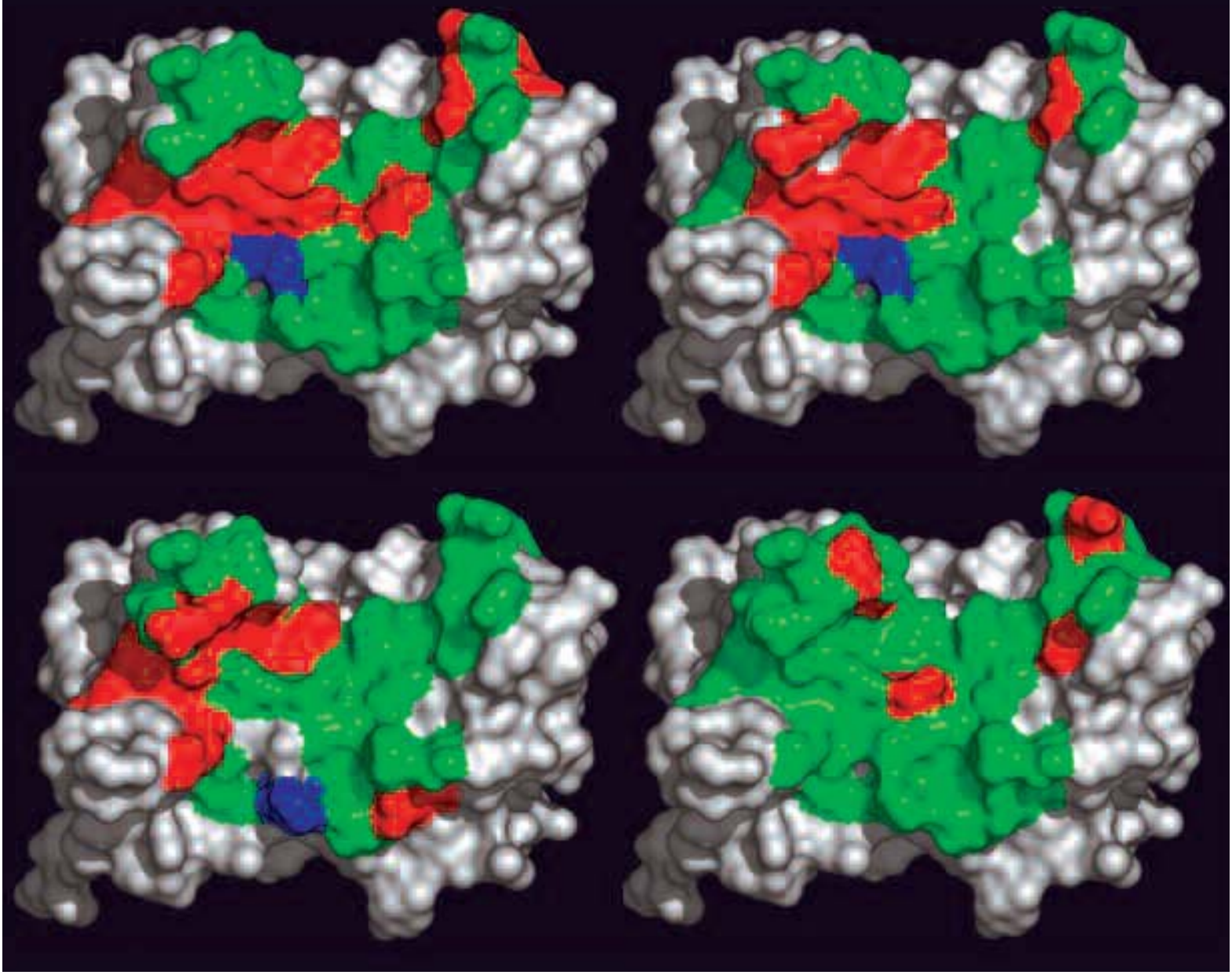
ASBMB Today

Constituent Society of FASEB

AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY

Mapping Multiple Mutations

See BioBits page 28.



Why Choose 21st Century Biochemicals For Custom Peptides and Antibodies?

"...the dual phosphospecific antibody you

"...our in-house QC lab confirmed the high purity of the peptide."

"...of the 15 custom antibodies we ordered from your company, 13 worked. Thanks for the great work!"

Over 70 years combined experience manufacturing peptides and antibodies
Put our expertise to work for you in a collaborative atmosphere

The Pinnacle – Affinity Purified Antibodies >85% Success Rate!

Peptide Sequencing Included for 100% Guaranteed Peptide Fidelity

Complete 2 rabbit protocol with PhD technical support and epitope design ♦ From HPLC purified peptide to affinity purified antibody with no hidden charges!.....~~$1895~~

$1675

Special pricing through December 31, 2006

Phosphospecific Antibody Experts ♦ Custom Phosphospecific Ab's as low as $2395

Come speak with our scientists at
Neuroscience in Atlanta, GA - Booth 2127 and HUPO in Long Beach, CA - Booth 231

21st CENTURY BIOCHEMICALS

www.21stcenturybio.com

33 Locke Drive, Marlboro, MA 01752
P: 508.303.8222 Toll-free: 877.217.8238
F: 508.303.8333 E: info@21stcenturybio.com

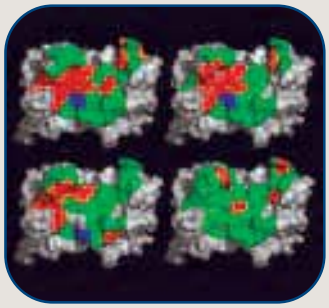
Made in the U.S.A.

www.asbmb.org

ASBMB Today

AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY

OCTOBER 2006
Volume 5, Issue 7



ON THE COVER:
Human growth hormone residues colored by contribution to receptor recognition: red, favorable; green, neutral; blue, unfavorable. The top left view, obtained by quantitative scanning, encompasses views obtained by conventional alanine (top right), serine (bottom left) or homolog (bottom right) scanning. See page 28.

2004 APEX® AWARDS FOR PUBLICATION EXCELLENCE

AWARDS OF EXCELLENCE:
MOST IMPROVED MAGAZINE
COLUMNS & EDITORIALS
DESIGN & LAYOUT

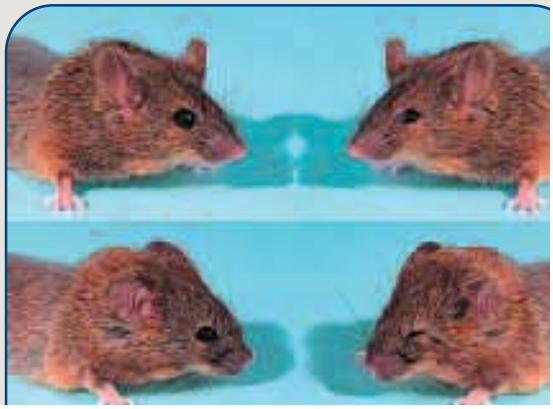
EXCEL AWARDS

BRONZE AWARD WINNER 2003

features

departments

23



ASBMB Today
is a monthly publication
of The American Society for
Biochemistry and Molecular Biology

ASBMB Today
9650 Rockville Pike,
Bethesda, MD 20814-3996
Phone: 301-634-7145; Fax: 301-634-7369

John Thompson
jthompson@asbmb.org
Editor

Nicole Kresge nkresge@asbmb.org
Science Editor

Nancy J. Rodnan nrodnan@asbmb.org
Director of Publications

The Erosion of Funding for Biomedical

As scientists, we are engaged in research that will have an impact on human health, as well as training the next generation of scientists that will maintain our competitiveness in the world. Thus, activism and advocacy by biomedical scientists to increase the NIH budget are not issues of self-interest for scientists. As citizens, we need to take this message to our local community. We recently sent a survey to all ASBMB members asking for your help in reaching your local congressman or congresswoman at home. It was gratifying to see that 92% of those who responded are willing to do this, and 92% are willing to work with ASBMB as issues related to biomedical research funding are taken up by Congress.

Your comments fell into two categories. Many of you are extremely sophisticated and have worked actively to educate your representatives. The most active of you already have long-standing relationships with your congressional representatives. Many of you feel that your congressmen and congresswomen are strong advocates of biomedical research already. But there were some members who are in districts of Bush conservatives, who felt that nothing could be done to get through to them. I would suggest that those are exactly the most important people to keep going after!! I am getting graduate students involved in local meetings with members Congress, and they are interested in being involved, as they are very uncertain about the future of biomedical research, which is their future. They are also willing to be challenged by the tough task of convincing those who oppose increases in funding biomedical research. Think about inviting your congressman or congresswoman to your department or laboratory, and get students involved in that visit. They may accept your invitation and come visit, as they are trying to increase their visibility during this electoral campaign. Be sure that there are professors who are long-term constituents in the group.

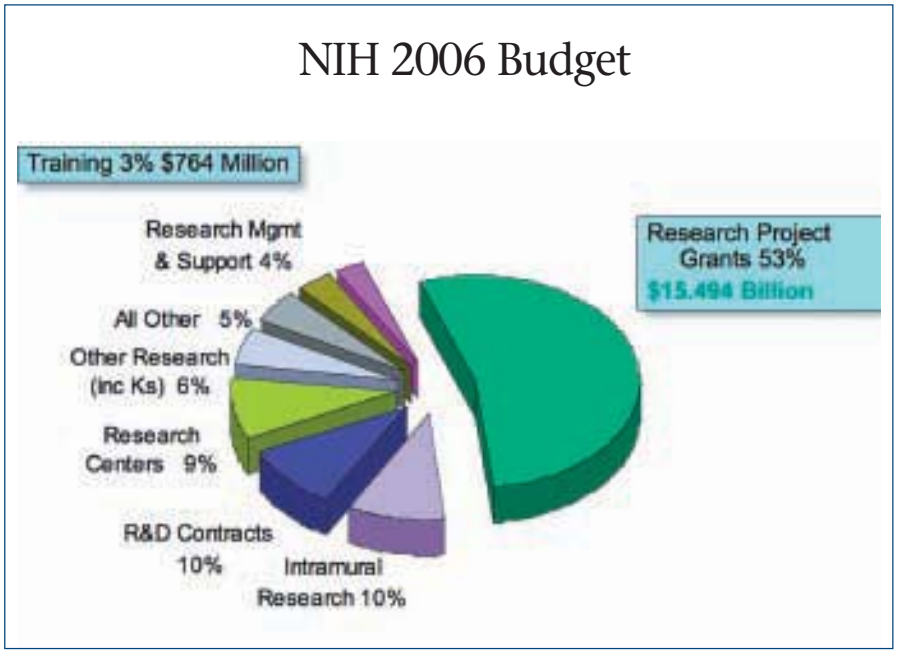
The majority of responses to the survey were from those would like to participate, but don't really know how. It's not as hard as you might imagine, and you might really enjoy it! A detailed set of instructions for how to find your congressional rep[resentative, get in touch with him or her, and make your case that biomedical research is a good investment is found on a new web site that ASBMB has put together (www.faseb.org/asbmb/pa/advocacy/index.html). Your representative has a local office, and you can set up a meeting with the local staff. You can provide examples from your own research of the breakthroughs that may result from it, and the benefits to human health. You should think about a concise message, and you should expect to field hard questions. Certain representatives feel that the NIH budget is not properly deployed. You can point to the fact that the NIH Reauthorization Act, the goal of which is to make sure the

Dr. Heidi E. Hamm

Research Will Not Change on its Own!

NIH is as effective as it can be, is now making its way through Congress. Be prepared to answer the question, "What have we gotten for doubling the NIH budget?" According to NIH Director Elias Zerhouni, "One of the things that occurred during the doubling is we added another year to the life expectancy for Americans." Consider, too, that there are now 10 million cancer survivors living in the U.S.; these people and their families have been touched directly by research.

I think there is a common perception among scientists that they have to go to Washington to meet with their representatives. But especially now, your representative is often at home, campaigning, and wants to reach out to his or her constituency. You have a great opportunity to make the case with him or her that the inflow of NIH dollars locally leads to a sizeable economic boost, the creation of many high-quality jobs, and the generation of new, state-of-the-art biomedical research buildings. The multiplier effect of NIH dollars flowing into a local economy can be substantial (studies in different states have documented effects of anywhere from 1.6 to 4-fold) since the people who are hired on new grants are consumers and spend locally, biomedical supplies and equipment are bought, buildings being built create jobs in the construction sector, and those dollars flow through the economy. In addition, there are local tax benefits from these high-quality jobs. There are many intangible returns from biomedical research nationally as well as locally. We are training the next generation of creative scientists, and their innovations and breakthroughs in research and technology will help to maintain our competitiveness in the world. Research breakthroughs can prevent disease before it strikes, impacting positively on the costs of health care.



Breakdown of the 2006 NIH budget. The RPG portion, 53% this year, is down from a high of 56% in 2001. Other portions of the NIH budget are used in extramural research, such as the training, K awards, research centers and contracts; 10% goes to the intramural research program.

Mary Wolley of Research!America wrote this: Every stake-holder in research should ask themselves whether their own elected representatives are on the record as active current supporters of research. If there is no active support of those who champion research and no perceived consequence to voting to cut research, and if the voters at home seem to be paying no attention, lawmakers will not necessarily vote for research funding. We all must be clear about the political realities of an enterprise that is funded with public dollars and regulated in the public's interest, but which remains nearly invisible to the public. So please, get to know your congressional representatives, establish a relationship with them and become someone they can turn to when they need information about your university, your medical center, or biomedical research. And educate them about the best investment for a higher quality of life in the future: biomedical research!

FASEB Grassroots Campaign Stresses Critical Value of NIH-Funded Research

During the August Congressional recess FASEB focused on a program to recruit scientists for a nationwide grassroots campaign in support of medical research. "It is time to reeducate Congress and the public about the critical value of NIH," said Leo Furcht, FASEB President. "There's overwhelming support for medical research—everyone looks forward to the next breakthrough, the next new treatment. We just need to make the connection between lifesaving advances and funding of the National Institutes of Health."

To kick-off the campaign, FASEB is unveiling a customizable slide presentation that scientists, department heads and deans can use locally to demonstrate NIH's impact on human health. "The truth is that we've made remarkable advances in heart disease, cancer, infectious illnesses, just to name a few, and these can all be traced back to NIH funded research," stated Carrie Wolinetz, FASEB Director of Communications. "We wanted to provide scientists with a tool to help them tell the stories behind medical breakthroughs: how basic research is translated; how NIH funds research in their own community; and how our quality of life has improved thanks to NIH-sponsored discoveries."

"Nothing is more important than the health and well-being of the American people. We are all only one diagnosis away from needing the hope that NIH embodies," Furcht continued. "It is our obligation, as a scientific community, to explain how science is done—to explain how continued improvements in human health are dependent on a sustained commitment to NIH. Supporting medical research in concept is no longer enough." The FASEB slide presentation can be accessed at: http://opa.faseb.org/pages/Advocacy/advocacyresources.htm

According to Wolinetz, FASEB is working to create versions of the presentation for every state. "We would like to see researchers presenting this to community groups, neighbors, colleagues, and even their members of Congress when they're at home in their districts." She added that FASEB will continue to produce additional advocacy material for use by scientists, all of which will be freely available on the FASEB website. Currently, available advocacy resources include, but are not limited to: a timeline of medical research breakthroughs aimed at demonstrating the span between basic research discovery and medical advancement; information on NIH funding trends; illustrations and highlights related to embryonic stem cell research; slides on the importance of animal research; and the *Breakthroughs in Bioscience* series. The *Breakthroughs* are colorfully illustrated articles describing scientific breakthroughs that have impacted society, including the most recent edition on breast cancer, estrogen receptors and the development of tamoxifen. These articles can be downloaded from the FASEB website or requested as high-quality hard copies at no cost from the FASEB Office of Public Affairs.

As a pilot project in FASEB's grassroots program, a number of member society scientists recently met with the district offices of the Minnesota Congressional delegation. Jon Retzlaff, Director of Legislative Relations, arranged meetings with senior staff in the home offices of Representatives Gil Gutknecht (R-MN) and Mark Kennedy (R-MN). Joining him at the Gutknecht meeting were three researchers from the Mayo Clinic: Tom Spelsberg, Ph.D., member of ASBMB and two other FASEB societies; Sundeep Khosla, M.D.; and Virginia Miller, Ph.D. Partnering with FASEB in this meeting was the American Heart Association, who was represented by Bradley Peterson, Senior Advocacy Director, Greater Midwest Affiliate. Retzlaff also met separately with the Regional Affairs and Policy Liaison staffer for Senator Norm Coleman (R-MN).

These meetings were in part to introduce FASEB and to demonstrate that we represent local researchers living and working in their districts," said Retzlaff. "Another main topic of discussion was our proposal for working together to organize a public forum in Minnesota on advances in medical research." The forum would be an opportunity for the general public and health professionals to meet with scientists, clinicians and practitioners, and learn about the progress being made on a range of research initiatives. According to Retzlaff, this idea is being modeled after events that took place in 2002 and 2003 when NIH Institute and Center Directors traveled to districts in Wisconsin, Minnesota and Ohio, to participate in community health forums to discuss NIH activities and steps people can take to improve their health. Thus far, feedback from Congressional staff and the members for which they work has been positive.

Carrie D. Wolinetz, Ph.D.
FASEB Office of Public Affairs

LifeSciences2007

A joint meeting of the Biochemical Society, the British Pharmacological Society and The Physiological Society

8–12 July 2007, Glasgow, UK

THEMES:

● Cancer ● Cardiovascular Bioscience ● Central Nervous System
● Education ● Exercise ● GPCR ● Imaging ● Inflammation
● Ion Channels ● Metabolism ● Signalling

ABSTRACT SUBMISSION DEADLINE:
26 February 2007

EARLY REGISTRATION DEADLINE:
27 April 2007

Sign up for Life Sciences 2007 email alerts – up-to-the-minute news direct to your desktop!

Bookmark the web address and put the date in your diary for 2007

www.LifeSciences2007.org

for all the latest programme information

Biochemical Society

BPS BRITISH PHARMACOLOGICAL SOCIETY
Today's science, tomorrow's medicines

The Physiological Society

Genetic Study May Help Identify Those Most at Risk for Alcoholism

Scan of human genome may provide important new tools for prevention and treatment

Researchers at the Molecular Neurobiology Branch of the National Institute on Drug Abuse (NIDA), have completed the most comprehensive scan of the human genome to date linked to the ongoing efforts to identify people most at risk for developing alcoholism. This study represents the first time the new genomic technology has been used to comprehensively identify genes linked to substance abuse. The study will be published in the December 2006 issue of the *American Journal of Medical Genetics Part B* (Neuropsychiatric Genetics).

"Tools such as pooled data genome scanning give us a completely new way of looking at complex biological processes, such as addiction," says NIH Director Elias A. Zerhouni. "The ability to pinpoint genes in the human genome responsible for disease has the potential to revolutionize our ability to treat and even prevent diseases."

"Previous studies established that alcoholism runs in families, but this research has given us the most extensive catalogue yet of the genetic variations that may contribute to the hereditary nature of this disease," says NIDA Director Dr. Nora D. Volkow. "We now have new tools that will allow us to better understand the physiological foundation of addiction."

"This is an important contribution to studies of the genetics of alcoholism and co-occurring substance use disorders," adds Dr. Ting-Kai Li, director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). "The findings will open many new avenues of research into common factors in genetic vulnerability and common mechanisms of disease."

NIDA researchers found genetic variations clustered around 51 defined chromosomal regions that may play roles in alcohol addiction. The candidate genes are involved in many key activities, including cell-to-cell communication, control of protein synthesis, regulation of development, and cell-to-cell interactions. For example, one gene implicated in this study, the AIP1 gene, is a known disease-related gene expressed primarily in the brain, where it helps brain cells set up and maintain contacts with the appropriate neighboring cells. Many of the nominated genes have been previously identified in other addiction research, providing support to the idea that common genetic variants are involved in human vulnerability to substance abuse.

The scientists, led by Dr. George Uhl, included Catherine Johnson, Donna Walther, Dr. Tomas Drgon, and Dr. Qing-Rong Liu. Their team developed, validated, and applied a new genetic platform that allowed them to generate the equivalent of more than 29 million individual genotypes and to analyze 104,268 genetic variations from unrelated alcohol-dependent and control individuals. The scientists used DNA samples that were collected by investigators of the Collaborative Study on the Genetics of Alcoholism, a study funded by NIAAA, that included Howard Edenberg, Tatiana Foroud, and John Rice, who are coauthors of the paper. These samples had been analyzed previously to look for genetic associations to alcoholism, but the resolution and coverage achieved in the present study are unprecedented.

"The observations from this study provide a graphic display of the close relationships between genetic vulnerability to alcoholism and genetic vulnerability to other addictions," says Dr Uhl. "Ongoing and future studies will help us to identify how the variations in these candidate genes contribute to differences in addiction vulnerability."

"We know that vulnerabilities to substance abuse involve complex traits with strong genetic influences," adds Dr. Volkow. "Finding ways to identify who is most physiologically vulnerable to addiction will be a tremendous step towards more effective prevention and treatment approaches."

NAS Accepting Applications for Graduate Fellowship Program

This Graduate Fellowship Program of the National Academies of Science is designed to familiarize graduate and postdoctoral students in science and technology policy with the interactions among science, technology, and government. As a result, students in the fields of science, engineering, medicine, veterinary medicine, business, and law develop essential skills different from those attained in academia, which will help them make the transition from graduate student to a professional.

Applications are now being accepted for the 2007 sessions. The program will consist of three 10-week sessions:
Winter: January 8 through March 16
Summer: June 4 through August 10
Fall: September 17 through November 21

Graduate students, postdoctoral scholars, and those who have completed graduate studies or postdoctoral research within the last five years are eligible to apply. Candidates should submit an application and request that a mentor/adviser fill out a reference form. Both forms are available on the Web at http://national-academies.org/policyfellows.

The deadline for receipt of application material is November 1 for the winter program, March 1 for the summer program, and June 1 for the fall program. Candidates may apply to all three programs concurrently.

Additional details about the program and a link to join the mailing list are available on the Web site. Questions should be directed to: policyfellows@nas.edu.

Osaka Bioscience Institute:

A World Leader in Scientific Research

The Osaka Bioscience Institute (OBI) was established in 1987 as part of the centennial commemoration of the City of Osaka. OBI is a non-profit organization with support and cooperation from the city, the Japanese government, academia, and industry. The principal goal of the institute is to pursue academic research with internationally acclaimed quality in the fields of bioscience and medical science.

OBI's first director was Dr. Osamu Hayaishi (1987-1998) who is currently dean of OBI. He was succeeded by Dr. Hidesaburo Hanafusa (1998-2005), and last year Dr. Shigetada Nakanishi was appointed as the third director. OBI's policy, which is unique among Japanese research institutions, is to encourage the flow of research by setting time limits and maintaining a strict advisory system. An advisory committee consisting of two foreign and three domestic scientists meets annually and is dedicated not only to evaluating each research project, but also the programs of the institute as a whole and its individual research departments.

The institution has recorded many scientific achievements over the past 18 years. Best known example are identification of the basic mechanisms of apoptosis by Dr. Shigekazu Nagata and the control mechanism of sleeping disclosed by Dr. Hayaishi. The quality of OBI research was exemplified by a 2002 report from ISI Thompson, which ranked OBI at the top internationally in the impact factors of molecular biology and genetics papers published during 1991-2001. As a result, OBI has garnered an array of awards worldwide, including the Japan Order of Culture, Japan Academy Prize, the Wolf Prize (Israel), the Jimenez Diaz Memorial Award (Spain), the Albert Lasker Basic Medical Research Award (USA), Howard Taylor Ricketts Award (USA), Sloan Prize (USA), Le Prix Antoine Lacassagne (France), Koch Prize (Germany), Boehring Prize (Germany), Luigi Musajo Award (Italy) and Bristol-Myers Squibb Award (USA).

OBI Research Activities

OBI has four departments and two laboratories with about thirty-five regular faculty members and several active emeritus members. About 80 scientists are currently working in a variety of mutually related fields of bioscience and medical science. Most of them are young researchers, both from Japan and abroad, and include

OBI
Osaka Bioscience Institute

Set in front of the OBI building and symbolizing the institute's mission is "The Gate of Hope," a sculpture by the famous Japanese artist Yasuo Mizui.

postdoctoral fellows, researchers from industry, and graduate students from affiliated universities. There is active collaboration domestically and internationally, and the exchange of scientific information is facilitated by frequent lectures and seminars presented by outstanding scientists, from both Japan and abroad.

Dr. Nakanishi heads the Department of Systems Biology and is working on regulatory mechanisms of the neural network. His group previously elucidated the molecular nature of G protein-coupled metabotropic and NMDA glutamate receptors by developing a novel functional cloning that combined *Xenopus* oocyte expression systems and electrophysiology. They disclosed many novel synaptic mechanisms, not only by applying multidisciplinary approaches but also by developing new techniques that allowed selective and conditional ablation of specific neuronal cell types in the neural network, and reversible blocking of synaptic transmission in the specified neural circuit. The projects in this department are currently directed toward how the functional cerebella network is established in an activity-dependent manner during development, how the cerebella network controls motor coordination and motor learning, and how the basal ganglia network concertedly controls motor balance and induces addiction of abusive drugs.

Director Emeritus Hanafusa is the head of the Laboratory of Molecular Oncology and is working on the basic mechanism of cancer. In recent years,

OBI has had a number of young scientists from abroad and promotes international and mingled atmosphere. From right to left, Dr. Sergei Dzyuba (USA), Mr. Jihwan Myung (graduate student) (Korea); Dr. Maria Allhorn (Sweden); Dr. Mei-Hong Qiu (China).

remarkable advances in molecular biology have shown that the transformation of normal cells to cancer cells is mediated by two kinds of genes that play key roles in oncogenesis: oncogenes, which promote aggressive cell proliferation, and tumor suppressor genes, which are associated with inhibition of abnormal cell growth and apoptosis. This laboratory has continued to explore the basic mechanisms of cancer through research on oncogenes. It is focusing on the key oncogenes encoding Crk adaptor protein and trying to elucidate how this oncogene product generates the signals leading to oncogenic transformation. In addition, the lab is extensively studying human cell transformation mediated by oncogenes such as Ras and Src.

Hisataka Sabe heads the Department of Molecular Biology and is studying mechanistic principles of cell adhesion, migration and tumor invasion. This lab originally identified several ArfGAP molecules that are binding partners for paxillin, an integrin signaling and scaffolding protein. Extensive analysis on paxillin and its related molecules led them to ask how actin-cytoskeletal remodeling is coordinated with the process of membrane remodeling, and how cells perceive their collision with target substances in order to stop moving or to change the direction of movement during the contact inhibition.

Yoshihiro Urade heads the Department of Molecular Behavioral Biology and revealed that naturalistic sleep is induced by the endogenous prostaglandin D_2 (PGD_2), the principal prostaglandin produced in the central nervous system (CNS). The lab's aim is to continue to investigate the function of this enzyme and the

Continued on next page

cellular changes caused by PGD_2 during sleep. PGD_2 is also known to be a mediator of allergic response, but this PGD_2 is synthesized by the action of an enzyme different from the enzyme in the CNS. The lab succeeded in crystallizing both enzymes and analyzed their structures. These achievements are vital to designing and assessing new anti-doze drugs and anti-allergic drugs with low rates of adverse reactions.

Toru Takumi heads the Laboratory of Neuroscience. Using cutting-edge ES technology, researchers are seeking to make model mice with human biological abnormalities, such as chromosomal aberrations, based on clinical results. The mice will be the founders for forward genetics and a target for systems biological approaches. Another approach is reverse genetics, a method that finds candidate genes using the transcriptome and proteome. This approach has led to the study of neuronal dendrites and dendritic spines. The output of the circadian clock includes various physiological phenomena such as a sleep-wake cycle, hormonal secretion, and even mental states. Using the established systems of the circadian rhythm consisting of the canonical clock genes, this laboratory also approaches mental states in light of biological clocks.

Head of the Department of Developmental Biology is Takahisa Furukawa. One of the goals in this department is to understand the molecular mechanism of photoreceptor cell development in mammals. The lab demonstrated that *Otx2* and *Crx* play critical roles in retinal photoreceptor development. Moreover, they showed that *Otx2* is essential and sufficient for the cell fate determination of retinal photoreceptors. This department is currently studying the mechanisms of cell proliferation of retinal progenitor cells and the mechanisms of neuronal cell polarity formation in the retina.

The OBI Atmosphere

OBI promotes an international atmosphere, and the research staffs in OBI have had many foreign researchers. For example, Dr. Frederick Tsuji, currently a professor at the University of California, was the head of one of the departments, and Dr. Kubata Bruno Kilunga, who was engaged in sleep-inducible substances in Trypanosome at OBI as a research associate, has returned to Africa and international work as Network Director of Bioscience Eastern and Central Africa based in Nairobi, Kenya. Dr. Zhi-Li Huang from China is presently the vice-head of the Department of Molecular Behavioral Biology. He says, "OBI is creating an international atmosphere for the scientists coming from the world. Education on scientific motivation, competitive systems and nice experimental facilities let researchers grow to be good scientists."

The aim of OBI is to foster young researchers. All department and laboratory heads hold joint appointments in the graduate schools of Kyoto, Osaka, or Osaka City Universities. OBI also accepts research fellows, including postdoctoral fellows selected under either domestic or international scholarships, and from industry. More than 30 such fellows and graduate students are currently working in OBI. OBI seeks to promote international exchange through study with foreign researchers and has a number of young scientists from the USA, Europe, and Asia.

Dr. Sergei Dzyuba (JSPS fellow) who came from Columbia University in New York says, "It has been a great experience being here at OBI. I was trained as a chemist, but here I have learned a lot in bioscience and medical science. I hope to continue a collaborative research and come back to OBI in the future."

Another JSPS fellow, Dr. Maria Allhorn from Lund University, Sweden, says, "OBI gives a great opportunity to reach a highly qualified scientific world under the most exciting and satisfactory conditions one can experience. Once you become a member of this Institute, you will feel that there is no limit to expanding your research area. There is a nice collaboration with colleagues at OBI, daily exchange of knowledge and interesting discussions."

Jihwan Myung from Korea (a visiting graduate student) says, "The Institute itself is a self-contained research powerhouse. I was surprised to see a graduate student having easy access to state-of-the-art (and often very expensive) equipment. OBI is also often visited by famous oversea investigators who I am familiar with only through papers. I have been able to be in touch with the world."

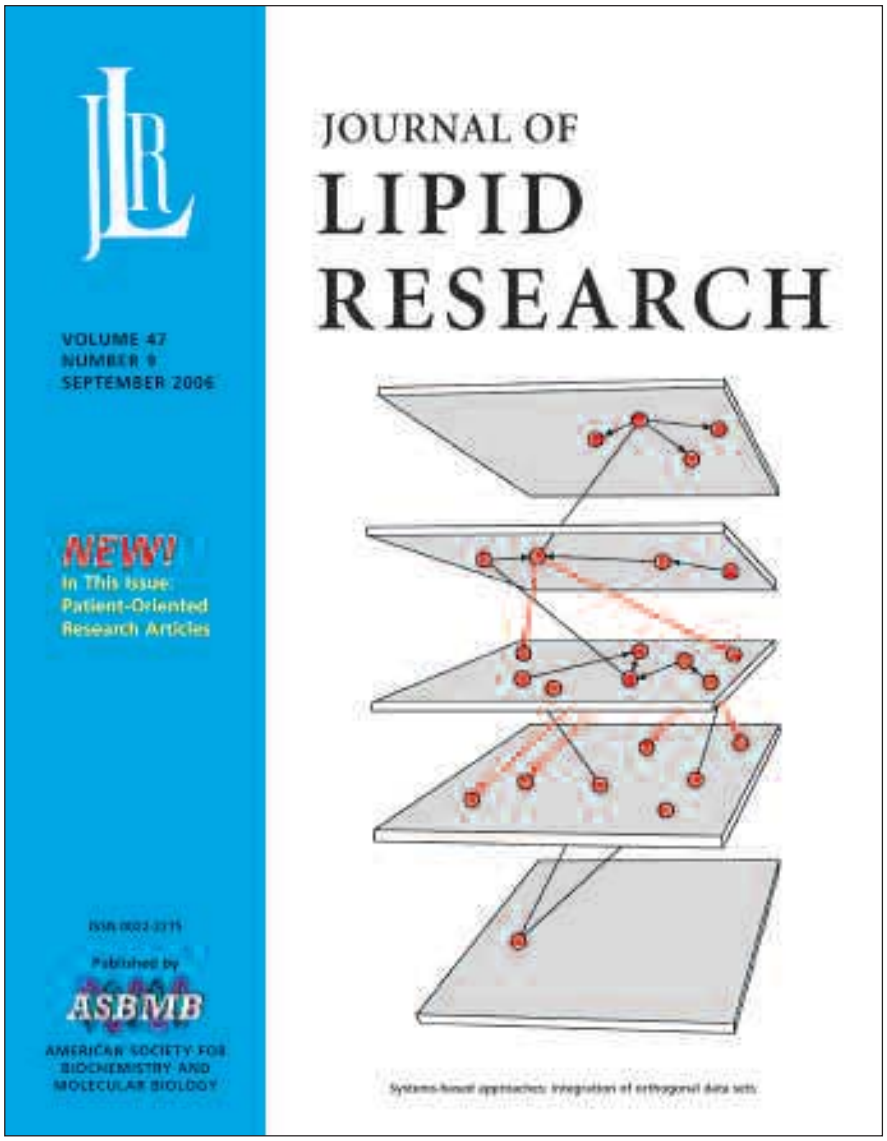
Dr. Samuel Colman introduced OBI in his book, Japanese Science from the Inside, (Routledge, London and New York, 1999). He stated that "Japan needs far more OBI-like institutions to promote career development." In fact, many of the leading universities in Japan are now adapting their programs along the lines of the OBI system.

JLR Looks at Systems Biology

The September issue of the *Journal of Lipid Research* (JLR) marked the beginning of a new thematic review series for the Journal. The series, coordinated by Associate Editor Aldons J. Lusis, focuses on systems-level approaches to metabolic and cardiovascular disorders.

"Systems-level" refers to a kind of biologic analysis that looks beyond individual genes, proteins, or lipids to the ensemble of multiple elements of a system. A key concept in systems biology is that of "emergent properties," or important features of biologic systems that can best be identified by examining the system as a whole. In these experiments, studies of the individual components of the system would not provide mechanistic understanding of the overall dynamics of the system.

"The goal of this series of reviews is to illustrate how systems-based approaches can complement traditional approaches to the biology of lipids and diseases involving lipids," explains Lusis in his September editorial. "The most elegant systems biology studies to date have been in model organisms, such as bacteria, yeast, *Caenorhabditis elegans*, and flies. However, a number of studies involving various global data sets for mammals have already contributed importantly to our understanding of metabolic and cardiovascular diseases."



There will be a total of seven reviews in the series, with a new article appearing in the Journal each month. In the first review, Karen Reue and Laurent Vergnes discuss the integration of genomic resources for the identification and functional analysis of genes involved in lipid metabolism. In the second article in the series, Andrew Watson will review "lipidomics," a systems-based study of all lipids, the molecules with which they interact, and their functions. In the third review, Jim Weiss will look at studies of the dynamics of cardiac and smooth muscle metabolism. Next, Eric Schadt will discuss how systems-based approaches can be used to define targets for therapeutic intervention of the yeast genetic interaction network. In the fifth article, Peipei Ping and Thomas Drake will review the various levels of proteomic investigation as they apply to metabolic and vascular diseases. Then, Irwin Kurland will focus on metabolomics, the systematic profiling of metabolites using nuclear magnetic resonance, tandem mass spectrometry, calorimetry, and stable isotopes. And in the final review, Johan Bjorkegren and Jesper Tegnér will look at multi-organ profiling in relation to coronary artery disease.

Education and Professional

Future issues of *ASBMB Today* will contain articles about Education and Professional Development (EPD) activities sponsored by the Society. This month we highlight the 2007 Meeting in Washington, DC, and the activities of the Undergraduate Affiliates Network (UAN).

The Education and Professional Development Theme Meeting in 2007

The Education and Professional Development theme at the 2007 Annual Meeting will feature both something old and something new. Continuing last year's highly successful "Classroom of the Future" theme, the major symposium focusing on classroom teaching will highlight a number of exciting initiatives in the field of life science education.

Cathy Drennan, MIT, will address issues related to combining chemistry and biology education in introductory courses for science majors. Carla Mattos, North Carolina State University, an NSF PECASE Award winner, will tell how she involves undergraduates in sophisticated structural biology research, in both a formal class and the lab, while Ellis Bell, University of Richmond, will discuss ways to engage freshman chemistry students in real research activities that cross the disciplinary boundaries between chemistry, physics and biology.

On the meeting's opening day last year, over 150 undergraduates participated in a session featuring a wide range of research activities, and this year undergraduate research will again be highlighted. There will be two workshops organized by the EPD committee. One featuring outreach and service learning activities, was organized by Neena Grover, Colorado College, and the other on the use of molecular models in teaching, Tactile Teaching: Exploring Protein Structure/Function Using Physical Models will be run by Tim Herman. In addition to Saturday's Undergraduate Poster competition, the meeting will feature an NSF-sponsored session where undergraduate faculty and students present their research. Several highly successful faculty, Lisa Gentile, University of Richmond; Teaster Baird, SFSU; and Mark Wallert and Joe Provost from Minnesota State University at Moorhead will present their research. Undergraduate students selected from submitted abstracts will also be featured.

Transitions from Graduate Student to Post Doc to Faculty Member will be highlighted and accompanied by a presentation from MCB Program Officer Parag Chitnis on NSF funding opportunities. The undergraduate community will have a designated workshop on funding opportunities specifically for undergraduate institutions, particular NIH area grants, and NSF RUI grants run by Jean Chin, NIH (Area grants program) and Ellis Bell, Biomolecular Systems Cluster program officer at NSF.

The final session , Preparing for a Successful Career in Industry, will highlight preparation for careers in industry. This session will be chaired by ASBMB Council Member Bob Copeland from GlaxoSmithKline, and will include talks by Manuel Navia, Oxford Bioscience Partners, and EPD Committee member Gregory Bertenshaw.

Undergraduate Student and Faculty Travel Awards Now Administered through the UAN

As always, ASBMB offers a number of travel awards aimed at students and faculty from Primarily Undergraduate Institutions (PUI). This year these awards will be administered by the Undergraduate Affiliates Network, and details can be found on the UAN page of the ASBMB Education and Professional Development website. While preference will be given to faculty and students affiliated with ASBMB through the UAN program, which has automatic student travel awards for affiliated programs, all undergraduate students and PUI faculty are encouraged to join the network and apply. Affiliation with the network costs $200 per group, and each group (program, laboratory, etc. with five or more undergraduates) qualifies for an automatic travel award of $400 and may submit an application for a Faculty Travel Award. This year, as last, a number of undergraduate travel awards are based upon presentations at Fall regional UAN meetings, where students present their research in a competitive setting with winners in four thematic categories being selected. At the poster competition, thematic judging will focus on four broad areas of the molecular life sciences: Protein Structure and Function, Signal Transduction, Gene Expression and Regulation, and a General Biosciences category. Students will be able to indicate the category in which they wish to be considered when they submit their abstracts.

Development

This year there will be three Fall regional meetings featuring undergraduate presentations. These meetings play a key role in the development of young scientists, offering a venue to bring together summer research and "practice" in a formal presentation. This can pay off: last year in San Francisco, two of the winners received travel awards to attend the meeting as a result of their participation in regional meetings. Two other participants in the San Francisco Meeting went on to win awards at the Protein Society Meeting.

Northwest Regional UAN to Host Second Regional ASBMB Meeting

The northwest regional UAN MSU Moorhead chapter is gearing up for its second annual Regional ASBMB meeting. "We are very excited about this" said Joseph Provost, Co-Director of the Northwest UAN. "Last year's meeting was much bigger than we expected and the students were all fully involved." This year's meeting will continue the theme of serving industrial needs and research interests. Mark Wallert, Co-Director of the Northwest UAN said, "One of our key speakers will be from Minnesota BioBusiness. This will provide an opportunity for those attending to visit with a key leader in the biochemistry/biotechnology industry, and learn about will hear about the skills needed and career possibilities in that industry." The meeting will include both a poster session and an oral presentation. "I expect a very difficult time judging the posters for each of the four travel awards to the 2007 ASBMB meeting in Washington, DC," said Provost. One of last year's poster winners, Jennifer Taves, a three-year UAN member, who presented a poster at the 2006 ASBMB meeting is currently preparing a manuscript on her work with proteases. For travel award winner Eun Hyuk Chang, his experience at the ASBMB meeting helped him obtain a summer internship at Harvard. This meeting is a wonderful opportunity for students to present their summer work and get ready for the 2007 ASBMB meeting. Details for the event can be found at: www.mnstate.edu/provost/asbmb.html

Virginia Commonwealth University's Biochemistry Department to Host Regional Meeting for Undergrads

On Friday, October 20, and Saturday, October 21, VCU's Department of Biochemistry will host its fourth annual Undergraduate Research Symposium. This event is a forum for the presentation of research projects performed by students enrolled in colleges and universities throughout the Southeast. Participants have the opportunity to present research posters to a diverse audience of graduate students, postdoctoral researchers, and faculty from VCU and other participating universities.

Students will also have an opportunity to view presentations in the Signaling and Metabolism of Bioactive Lipids (SMBL) Research Retreat. This event (held concurrently with the Undergraduate Research Symposium) features poster presentations by pre- and post-doctoral scientists whose research interests focus on such areas as phospholipases and lipid metabolism, the regulation of gene expression by lipids and their metabolites, bone and mineral metabolism, lipoprotein structure and function, and the biochemical pathways elicited through interactions between bioactive lipids and neuronal cells.

The event starts with a Keynote Address on Friday, October 20, by Dr. Jerome Strauss, Dean, VCU School of Medicine, He will present a seminar about his exciting research into genetic variations that predispose African-American mothers to premature delivery. Poster presentations will be Saturday, October 21, from 10:00 a.m. to 2:00 p.m.

Details of the meeting can be found at: www.vcu.edu/biochem/department/news-sym06.shtml

The Undergraduate Affiliates Network

The UAN continues to grow, with over 40 chapters now established. Each chapter receives an automatic travel award to help a student present his or her research at the National Meeting. It is not too late to affiliate your program and receive a travel award to the Washington, DC, meeting. ***Any School or program affiliated by the end of October will receive a travel award, provided that the student has submitted an abstract for the DC meeting.*** If you want your program affiliated with the network, please visit the ASBMB website and navigate to the Education link, where you can join the network or renew your program's affiliation on line.

Next month we will feature "Inside EPD" and focus on the faces and activities of EPD members.

Judith Klinman to Receive ASBMB-Merck Award

Judith Klinman, Professor of Chemistry and of Molecular and Cellular Biology at the University of California/Berkeley, has been selected to receive the ASBMB-Merck Award, in recognition of her outstanding contributions to research in biochemistry and molecular biology . The Award consists of a plaque, and transportation and expenses of the recipient and spouse to ASBMB's 2007 Annual Meeting, at which Dr. Klinman will present a lecture. Nominations must be originated by Society members, but the nominees need not be ASBMB members.

Dr. Judith Klinman

Dr. Klinman has made deep and extensive contributions to understanding the mechanism of enzyme action throughout her career and has been an exemplary scholar, teacher, and colleague. She fits well within the group of highly select and accomplished recipients of the ASBMB/Merck Award in stature and accomplishments. Furthermore, she will be the first woman scientist to receive this highly prestigious award.

She was the first to propose that hydrogen tunneling plays a role in enzyme catalysis. Many were initially skeptical of this proposal, but she persisted, carrying out extensive experiments on multiple systems to show clearly and broadly that tunneling is central to many biological processes. This seminal discovery led her to probe further into the behavior of enzymes that exhibit tunneling. She found quite complex behavior and, although it was not clear initially what the origin of this behavior was, she recognized that this complex behavior must result from properties of the surrounding protein environment.

Klinman proposed that the dynamic properties of the enzyme were important for tunneling. This connection between tunneling and the motional properties of proteins then extended the importance of tunneling as a means of obtaining insight into the fundamental dynamic properties of proteins. There are now computational groups, in addition to experimental enzymologists, basing their efforts to understand the fundamental chemical property of tunneling and the fundamental physical property of protein dynamics on data from the Klinman lab.

While the models and ideas have developed over the years, Klinman has been both icon and leader. And she has led most effectively, not trying to control or garner credit, but instead fostering interactions, asking hard questions of herself and others, and emphasizing what she doesn't understand, instead of seeking to impress with the strength of her work. Her respect for, and fostering of, the ideas and contributions of others is to be greatly admired and represents a trait that is important to recognize and reward in the scientific community.

Hydrogen Tunneling

Prior to Klinman's work, it was well established that electron tunneling was prevalent in enzymatic reactions, and that hydrogen tunneling could occur at very low temperatures. In 1989, Klinman and coworkers provided strong experimental evidence for hydrogen tunneling in an enzymatic reaction at room temperature. Although this work was greeted with skepticism, further work from Klinman and others have left no doubt that hydrogen tunneling is extensive, if not universal, in enzymatic hydrogen transfer (including hydride and proton transfer). This work established the fundamental chemical basis for enzymes that catalyze or use hydrogen transfer in their reactions.

The studies Klinman and her coworkers designed to explore tunneling behavior on enzymes revealed anomalous behaviors. Most simply, dependences of tunneling (or isotope effects) on temperature were explored with thermophilic enzymes. Behaviors different from those predicted in chemical theory led to the suggestion that the reaction barrier was not rigid, thereby introducing the importance of dynamics in enzymatic tunneling. Subsequent experimental work from Klinman, including differential tunneling contributions caused by mutations in residues 'behind' the active site with different steric effects, have provided additional support for this view. Currently, several labs are exploring, both computationally and experimentally, the connection between tunneling and protein dynamics. In essence, hydrogen tunneling, important and interesting in its own right, has provided insight into, and experimental guidance for, another,even more pervasive problem in biology, that of protein dynamics.

Enzyme Cofactors

Dr. Klinman's work on hydrogen abstraction mechanisms also led to the groundbreaking 1990 discovery of novel cofactors that facilitate redox reactions. By studying copper amine oxidases, her lab discovered the 2,4,5-trihydroxyphenylalanyl quinone (TPQ) cofactor. Not only did Klinman and coworkers establish the structure of this new cofactor, they also showed

Continued on next page

Scott Emr Selected for ASBMB-Avanti Award

Scott Emr, an HHMI Investigator and Professor in the Department of Cellular and Molecular Biology, University of California, San Diego, School of Medicine has been selected to receive the Avanti Award in Lipids. The Award recognizes outstanding research contributions in the area of lipids, and consists of a plaque, stipend, and transportation and expenses to present a lecture at the 2007 ASBMB Annual Meeting, April 28 –May 2 in Washington, DC. Past recipients include Dennis Vance in 2006, William Dowhan in 2005, William L. Smith in 2004, Robert Bittman in 2003, and Christian R.H. Raetz in 2002.

Dr. Emr is a highly accomplished molecular biologist who has already received extensive recognition for his many contributions by election to the American Academy of Arts and Sciences, and the recent award of the Hansen Foundation Gold Medal for elucidating the intracellular sorting and transport of proteins. Although not generally considered a lipid scientist, he has made many significant contributions to the lipid field by pursuing his interests in the regulation of intracellular vesicle trafficking using the power of yeast genetics and molecular biology. These accomplishments have played a major role in the recognition of lipids as important bioeffectors and not merely structural molecules. This recognition has increased activity in the lipid field, which has in turn stimulated the discovery of other important roles of lipids in cell regulation and control.


Dr. Scott Emr

Emr recognized over 10 years ago that the VPS34 gene encoded a phosphatidylinositol 3-kinase that is required for proper targeting of a subset of proteins to the vacuole. This unexpected finding, and the demonstration of a lipid product as being central to a vesicle mediated targeting event, led to the studies by Emr and others characterizing the lipid-dependent coding of cargo vesicles. Emr and coworkers have played a central role in systematically uncoding the information residing in the multiple phosphate derivatives of phosphatidylinositol that regulate and target transport vesicles from their source to their destination. His work has had an enormous influence on our understanding of trafficking events and placed phosphorylated lipids at the center of the regulation of this process.

A key aspect of Emr's approach has been to begin with genetic manipulation to gain clues as to which processes should be characterized, and then to characterize them biochemically. The maximum benefit of each approach is usually derived when they are combined. Emr has done an excellent job in unravelling important lipid-dependent membrane facilitated processes that would not have been uncovered by other means. He has also made important contributions to characterizing the endosomal sorting complex required for essential budding of vesicles into the lumen of the endosome. Again, components of this process involve phosphorylated phosphatidylinositols.

Continued from previous page
that it is derived from an amino acid side chain of the folded protein. These discoveries overturned previous models for metal catalyzed oxygen activation in these and other enzymes, in which the copper center was assumed to be the redox catalyst.

This discovery showed that complex derivatization of aromatic side chains can occur in natural proteins, generating new redox cofactors with unique properties. Subsequent work from her group showed that the extracellular protein lysyl oxidase, responsible for collagen and elastin cross-linking, contains a lysine cross-linked variant of TPQ. Other investigators identified new structures based on post-translational modifications of tryptophan. This work opened up the new and currently active field of protein-derived cofactors.

Molecular Oxygen in Enzymatic Reactions

Many of the redox enzymes that have been pursued in the Klinman laboratory use molecular oxygen as substrate. Klinman provided the experimental methods and background for applying 18-0 isotope effects to processes involving molecular oxygen. This was accomplished by comparing isotope effects and structural properties for a series of oxygen binding proteins. This analysis and additional work allowed Klinman to develop a powerful set of experimental probes for determining the mechanism of oxygen activation. These probes are shedding light on how proteins can reductively activate molecular oxygen to free radical intermediates while avoiding oxidative damage. Understanding reactions involving molecular oxygen has fundamental implications for chemistry, for evolution during the transition from an anaerobic to aerobic environment, and, ultimately, for learning how these reactions can be manipulated and engineered.

The Chromosome Cycle

Organizer: Hongtao Yu

The eukaryotic genomes are organized into chromosomes that consist of long strands of DNA molecules wound around histones and other chromosomal proteins. The genetic stability of an organism relies on the accurate duplication of its chromosomes and the subsequent equal partition of the duplicated chromosomes during each cell division. Chromosomal DNA is replicated in a semi-conservative fashion in S phase. The original and the replica copies of each chromosome are physically tethered together through cohesion to form a pair of sister chromatids. In mitosis, the centromeres of chromosomes nucleate the assembly of large protein complexes to form kinetochores that are captured by microtubule fibers of the mitotic spindle. After all pairs of sister chromatids achieve proper attachment to the mitotic spindle, sister chromatid cohesion is dissolved. The two sets of separated chromatids are pulled to the opposite poles of the dividing cell. After the completion of cytokinesis, each daughter cell inherits an identical set of chromosomes. In the past several years, intensive efforts from many laboratories around the world have significantly advanced our understanding of molecular mechanisms that govern the chromosome cycle and its coordination with the cell division cycle. Recent discoveries in this exciting area will be highlighted in the Chromosome Cycle theme at the 2007 ASBMB meeting in Washington D.C.

The Chromosome Cycle theme consists of the following four sessions: (1) **Chromatin Structure and Remodeling** (Chair: Geeta Narlikar, UC San Francisco); (2) **Chromosome Duplication and Cohesion** (Chair: Jan-Michael Peters, Research Institute of Molecular Pathology); (3) **Centromeres and Kinetochores** (Chair: Don Cleveland, UC San Diego); and (4) **Chromosome Segregation and Aneuploidy** (Chair: Hongtao Yu, UT Southwestern).

Dr. Hongtao Yu

The structure and remodeling of chromatin impact all biological processes that use chromatin as template, including transcription, DNA replication, DNA repair, and sister chromatid cohesion. Considering the tight packaging of chromosomal DNA in nucleosomes and the further compaction of linear nucleosome arrays into chromatin, it is truly remarkable that the large protein machineries involved in transcription or DNA replication can access chromosomal DNA in a regulated and timely manner. The talks in the **Chromatin Structure and Remodeling** session will provide insight into the fascinating process of chromatin remodeling. This session will be chaired by Dr. Geeta Narlikar (UC San Francisco). She will discuss the mechanisms of action for a class of ATP-dependent nucleosome remodeling protein complexes. Dr. Song Tan (Pennsylvania State University) will discuss how chromatin-modifying enzymes recognize their nucleosome substrates. Prof. Jeffery Hayes (University of Rochester Medical Center) will present his recent findings on the roles of histone tail domains in the structure, folding, and dynamics of chromatin fibers.

The **Chromosome Duplication and Cohesion** session will focus on the regulation of DNA replication and sister chromatid cohesion during the cell cycle. Dr. Jan-Michael Peters (RIMP) will chair this session. He will speak about the cell-cycle regulatory mechanisms of sister chromatid cohesion in mammalian cells. Dr. Camilla Sjögren (Karolinska Institutet) will discuss the functions of SMC protein complexes in mediating sister chromatid cohesion and DNA repair in the budding yeast. Dr. Johannes Walter (Harvard Medical School) will present his work on the mechanisms that restrict DNA replication to once-and-only-once per cell cycle in *Xenopus* egg extracts.

Centromeres and kinetochores not only provide the landing pads for spindle microtubules to capture chromosomes during mitosis, but also are the originating sites of important checkpoint signals that ensure proper mitotic progression. The **Centromeres and Kinetochores** session will focus on the structure and function of centromeres and kinetochores. This session will be chaired by Prof. Don Cleveland (UC San Diego). He will speak about the structure of the mammalian centromeres and the functions of kinetochores in mitotic spindle checkpoint signaling and the maintenance of chromosomal stability. Prof. Gary Karpen (UC Berkeley) will describe his recent studies on the sequence and epigenetic determinants of centromeres in *Drosophila*. He will also discuss the functions of centromeric proteins in regulating mitotic events. Dr. Huntington Willard, Nanaline H. Duke Professor and Director of Institute for Genome Sciences and Policy at Duke University, will describe the recent findings from his laboratory on the molecular organization of the human centromeric DNA and the assembly of human artificial chromosomes.

Chromosome segregation occurs in a highly synchronous fashion and is one of the most beautiful cell biological events. Errors in chromosome segregation leads to aneuploidy, a

Continued on next page

Chemical Biology Theme

Organizer: Jack Taunton, UCSF

Chemical approaches and concepts permeate modern cell and molecular biology research and thus will be on display throughout ASBMB. The Chemical Biology theme puts the spotlight on small molecules, including small molecules that were designed and synthesized by intelligent humans, as well as secondary metabolites that evolved by natural selection. The smallish molecules featured in the Chemical Biology theme range in size and complexity, from the simple fragments that jumpstart drug discovery, to the structurally ornate natural products assembled by protein factories in bacteria, fungi, and plants. In all cases, they elicit profound changes in the behavior of proteins, cells, or whole organisms. Small molecules can thus reveal previously unknown mechanisms in cell biology and physiology, as well as new ways to modulate protein structure and function. Even if they never make it to the clinic, small molecules often show us hidden vulnerabilities in complex biological networks and point the way toward innovative therapeutics. The ASBMB crew of Chemical Biologists will show how small molecules can do big things.

The Chemical Biology theme is organized into four sessions:

Chemical Biology of Cell Death (Chair: Paul Hergenrother, University of Illinois)

Fragment-Based Drug Discovery (Chair: Dan Erlanson, Sunesis Pharmaceuticals)

Antibiotics for the 21st Century (Chair: Floyd Romesberg, Scripps Research Institute)

Chemical and Cell Biology of Natural Products (Chair: Jack Taunton, UC San Francisco)

The Chemical Biology of Cell Death session will feature small molecules that reveal the multitude of mechanisms by which cells die. Craig Crews (Yale University) will present recent studies of a natural product from Chinese herbal medicine that triggers a calcium-dependent cell death pathway by an unprecedented mechanism. Junying Yuan (Harvard Medical School) will discuss her group's discovery of small molecules that modulate pro-apoptotic signals emanating from the stressed endoplasmic reticulum. Paul Hergenrother (University of Illinois) will describe novel small molecule activators of caspase signaling. These compounds are selectively cytotoxic to cancer cells with elevated caspase levels.

The Fragment-Based Drug Discovery session will feature cutting-edge talks on how to make drug discovery more efficient (and exciting). Despite their small size, drug-like molecules (with molecular weights of ~500 Daltons) can derive from a nearly infinite number of discrete structures. Because there aren't enough atoms (or medicinal chemists) in the universe to synthesize all of the possible structures, a major challenge in drug discovery is to figure out which ones to make for a given target or therapeutic area. The three talks in this session will reveal divergent solutions to the problem of identifying initial fragment hits that form specific interactions with their targets but necessarily bind with low-affinity. Harren Jhoti (Astex Pharmaceuticals) will discuss a high-throughput x-ray crystallography and chemoinformatics route to identifying fragment hits. Jon Ellman (UC Berkeley) will present a novel approach to fragment identification that exploits enzymatic catalysis to report a specific binding event. Session chair Dan Erlanson (Sunesis Pharmaceuticals) will discuss a completely different approach, in which small fragments are tethered to specific cysteines on a protein target by reversible disulfide bonds; fragment hits are identified by high-throughput mass spectrometry.

Dr. Jack Taunton

Resistance of disease-causing pathogens to 20th century antibiotics is spreading at a frightening pace, and few novel antibiotics have entered the clinic to meet this threat. The Antibiotics for the 21st Century session will present exciting recent studies in which small molecules target previously unexplored signaling pathways in pathogenic microorganisms. Deborah Hung (Broad Institute and Harvard Medical School) will describe small molecules that target bacterial virulence pathways that are essential for growth in their mammalian hosts but which are not essential for growth in culture. Floyd Romesberg (Scripps Research Institute) will discuss a novel signaling pathway that mediates resis-

Continued on page 21

Continued from previous page

hallmark of cancer cells. The molecular mechanism of chromosome segregation will be the main topic of the **Chromosome Segregation and Aneuploidy** session. Dr. Hongtao Yu (UT Southwestern) will chair this session and will discuss the molecular basis of the mitotic spindle checkpoint, a cell-cycle surveillance system that ensures the fidelity of chromosome segregation. Dr. Jan van Deursen (Mayo Clinic) will present his novel findings on the role of nuclear transport factors in chromosome segregation. Prof. Gary Gorbsky (OMRF) will discuss how the spindle checkpoint senses the lack of tension across sister kinetochores and how chromosome movement is regulated during mitosis.

2007 ASBMB

April 28 – May 2, 2007 • Washington,

Organized by: Benjamin F. Cravatt, The Scripps Research Institute, Michael K. Rosen, University

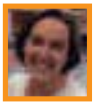
Abstract Submission Dea

Award Lectures

Herbert Tabor/Journal of Biological Chemistry Lectureship:

Anthony Hunter, The Salk Institute:
Tyrosine phosphorylation: from discovery to the kinome and beyond

Anthony Pawson, Samuel Lunenfeld Research Institute:
Phosphotyrosine signaling: A prototype for modular protein-protein interactions

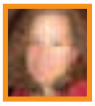


ASBMB Amgen Award

Angelika Amon
HHMI/Massachusetts Institute of Technology

ASBMB Award for Exemplary Contributions to Education

Sarah C. Elgin
Washington University



ASBMB Merck Award

Judith P. Klinman
University of California, Berkeley

Avanti Award in Lipids

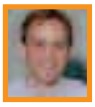
Scott D. Emr
HHMI/University of California, San Diego, School of Medicine

Fritz Lipmann Lectureship

Ronald M. Evans
The Salk Institute

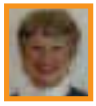
Howard K. Schachman Public Service Award

To Be Determined



Schering-Plough Research Institute Award

Christopher B. Burge
Massachusetts Institute of Technology



William C. Rose Award

Susan S. Taylor
HHMI/University of California, San Diego

Preliminary Program

Genome Dynamics

From Genome to Epigenome – Modification and Repair
Gregory L. Verdine**, Harvard University

Methylating and De-methylating DNA
Timothy Bestor*, Robert Fisher, Tomas Lindahl

Recombining and Modifying DNA
William S. Reznikoff, David G. Schatz*, Gregory Van Duyne

Making and Re-making DNA
Lorena Beese*, Gregory L. Verdine, Graham C. Walker

Telomeres and Telomerase
Elizabeth Blackburn, Kathleen Collins*, Carol Grieder

The Chromosome Cycle
Hongtao Yu**, University of Texas Southwestern Medical Center

Centromeres and Kinetochores
Donald W. Cleveland*, Gary H. Karpen, Huntington F. Willard

Chromatin Structure and Remodeling
Jeffrey J. Hayes, Geeta Narlikar*, Song Tan

Chromosome Duplication and Cohesion
Jan-Michael Peters*, Camilla Sjögren, Johannes Walter

Chromosome Segregation and Aneuploidy
Jan van Deursen, Gary J. Gorbsky, Hongtao Yu*

RNA
Kristen W. Lynch**, University of Texas Southwestern Medical School

Molecular Recognition and Enzymology of RNA
Robert T. Batey, Anna Marie Pyle*, Scott Strobel

RNA-Based Gene Regulation
Kristen W. Lynch*, Joel D. Richter, David Spector

Small RNAs
Witold Filipowicz*, Thomas Tuschl, E. Gerhart H. Wagner

RNA Modification: Mechanism and Function
Ronald Emeson, Kazuko Nishikura, Robert Reenan*

Protein Synthesis, Folding and Turnover
James R. Williamson**, The Scripps Research Institute

Molecular Mechanisms of Protein Biosynthesis
Rachel Green*, Daniel Herschlag, Timothy W. Nilsen

Co- and Post-Translational Folding
Elizabeth Craig, F. Ulrich Hartl, Jonathan S. Weissman*

Protein Modification and Turnover
Christopher P. Hill*, Christopher D. Lima, Tom Rapoport

Ribosome and Translation
Joseph D. Puglisi, James R. Williamson*, Nahum Sonenberg

Structure and Design

Macromolecular Structure and Dynamics
Joseph P. Noel**, The Salk Institute for Biological Studies

Conformational Transitions and Protein Aggregation
Jeffery W. Kelly, Beat Meier, Roland Riek*

Experimental and Computational Dynamics
Lewis E. Kay*, J. Andrew McCammon, Sunney Xie

Protein-Lipid Interface
Susan Buchanan, John Bushweller, Charles R. Sanders*

Structural and Mechanistic Evolution
Antony M. Dean, Joseph P. Noel*, Rama Ranganathan

Enzymes – Mechanism and Design
Dorothee Kern**, Brandeis University

Structural Enzymology
Karen Allen, Perry A. Frey, Gregory A. Petsko*, Dagmar Ringe

The Role of Dynamics in Enzyme Catalysis
Gordon G. Hammes, Dorothee Kern, Judith P. Klinman, Peter E. Wright*

Computational Studies of Mechanistic and Dynamical Aspects of Enzymes Reactions
Jiali Gao, Sharon Hammes-Schiffer*, Kenneth M. Merz, Jr.

Enzyme Design
Homme W. Hellinga, Kenneth N. Houk, Stephen L. Mayo*

Extracellular Matrix at Multiple Biological Scales
Vito Quaranta**, Vanderbilt University

Extracellular Matrix at the Cellular Scale
Viola Vogel*, Alissa Weaver, Peter D. Yurchenco

Extracellular Matrix at the Molecular Scale
Billy G. Hudson, Vito Quaranta*, Timothy A. Springer

Extracellular Matrix at the Organism Scale
Nick Brown, Uli Mueller*, Mary Zutter

Extracellular Matrix at the Tissue Scale
Elaine Fuchs*, Raghu Kalluri, Jeffrey H. Minor

Chemical Biology
Jack Taunton**, University of California, San Francisco

Chemical Biology of Cell Death
Craig Crews, Paul Hergenrother*, Junying Yuan

Fragment Based Drug Discovery
Jon Ellman, Daniel A. Erlanson*, Harren Jhoti

Chemistry and Cell Biology of Natural Products
Jun Liu, Jack Taunton*, Christopher Walsh

Antibiotics for the 21st Century
Heike Brotz-Oesterhelt, Deborah T. Hung, Floyd Romesberg*

Special Events

- 11th Annual Undergraduate Student Poster Competition
- ASBMB Business Meeting
- ASBMB Social Event
- Graduate and Postdoctoral Networking Reception
- Graduate and Postdoctoral Travel Award Symposium
- How to Publish in the JBC Workshops

www.asbmb.

Annual Meeting

DC • Held in conjunction with EB 2007

of Texas Southwestern Medical Center and the 2007 ASBMB Program Planning Committee

dline: November 8, 2006

**denotes thematic meeting chair / *denotes session chair

Cell Systems

Metabolism
Jared Rutter**, University of Utah School of Medicine

Metabolic Sensing and Signaling
David Carling, Michael Hall, Jared Rutter*

Molecular and Cellular Aspects of Metabolic Disease
Morris Birnbaum, Marc Montminy*, Craig B. Thompson

Mitochondria in Health and Disease
E. Dale Abel*, Nika N. Danial, Antonio Vidal-Puig

Aging and Metabolism
Andrew Dillin, Stephen L. Helfand, Pere Puigserver*, Richard Weindruch

Organelle Dynamics
Matthew Shair**, Harvard University

Golgi Structure and Biogenesis
Matthew Shair*, Jennifer Lippincott-Schwartz, Graham Warren

Membrane Biogenesis
Daniel E. Kahne*, Natividad Ruiz, Hajime Tokuda

Mitochondrial Dynamic
David Chan, Jodi Nunnari*, Richard Youle

Nuclear Dynamics
Ueli Aebi, Katherine S. Ullman, Yixian Zheng*

Systems Biology
Tobias Meyer**, Stanford University School of Medicine

Modeling of Cell Systems
James Ferrell*, Rustem Ismagilov, Wendell Lim

Molecular Profiling of Cell Systems
Tobias Meyer*, Elizabeth Winzeler

Proteomics of Cell Systems
Reudi H. Aebersold*, Anne-Claude Gavin, Michael Snyder

Mathematical Biology
Mark Chaplain, Ravi Iyengar, Edwin Munro, Vito Quaranta*

Minority Affairs Committee Sponsored Symposia
George Hill**, Vanderbilt University

Best Practices in Program Assessment
Taketa Felder*, A. James Hicks, John Matsui, J. Lynn Zimmerman

Infectious Diseases in Minority Populations – Hepatitis C
Craig E. Cameron*, Antonio Estrada, Kouacou Donan, Gerond Lake-Bakaar

Genetic Diseases in Minority Populations - Sickle Cell Anemia
Jane Hankins, Phillip A. Ortiz*, William P. Winter, Steven N. Wolff

Infectious Diseases in Minority Populations - Tuberculosis
Bavesh Kana, Ujjini Manjunatha, Marcos Milla*, Harvey Rubin

Signaling

Biochemistry and Signaling of Lipids
Hugh Rosen**, The Scripps Research Institute

Biogenesis, Transport and Compartmentalization of Lipids
Christoph Benning, Joost C.M. Holthuis, Dennis R. Voelker*

Chemical Probes of Lipid Systems
Doreen Cantrell, Benjamin F. Cravatt, Hugh Rosen*

Lipids as Transcriptional Regulators
Joseph L. Goldstein, Steven Kliewer*, Peter Tontonoz

Specific Protein-Lipid Interactions
Michael H. Gelb*, Tamir Gonen, Stephen White

Signaling Pathways Controlling Cell Structure and Fate
Michael B. Yaffe**, Massachusetts Institute of Technology

Cytokine and Growth Factor Signaling
Carl-Henrik Heldin, Mark Lemmon, Joseph Schlessinger*

DNA Damage Signaling
Wade Harper, Michele Pagano, Michael B. Yaffe*

Cell Cycle
Susan Biggins, Rebecca Heald*, Tim Stearns

Signaling to the Cytoskeleton
Sandrine Etienne-Manneville, Dyche Mullins*, Michael K. Rosen

Public Affairs Advisory Committee Sponsored Symposium
Sponsored by EB participating societies
NIH at the Crossroads: How Diminished Funds Will Impact Biomedical Research and what Scientists Can Do About it

Education and Professional Development Committee Sponsored Symposia
J. Ellis Bell**, University of Richmond

Classroom of the Future II
J. Ellis Bell*, Catherine L. Drennan, Carla Mattos

Science at Undergraduate Institutions
Teaster Baird, Lisa Gentile, Joseph J. Provost*, Mark A. Wallert*

Graduate Student/Postdoctoral Starting Faculty Transitions
Jessica Bell, Parag Chitnis*, Ann L. Miller

Preparing for a Successful Career in Industry
Gregory Bertenshaw*, Robert A. Copeland*, Manuek Navia

Travel Awards

Application Deadline: November 30, 2006

- Graduate Students / Postdoctoral Fellows
- Minority Graduate Students
- Systems Biology Workshop Teams

- Minority Scientists' Mixer
- Opening Reception
- Research Funding by the American Cancer Society
- Women Scientists' Networking Reception
- Meet the Speakers
- Thematic Receptions

org/meetings

Remote Control for Human Growth Hormone Gene Expression

Researchers at the University of Pennsylvania School of Medicine recently discovered a novel mechanism that works over an extensive genomic distance and controls the expression of human growth hormone (hGH) in the pituitary gland. This mechanism involves a newly discovered set of non-coding RNAs expressed in the vicinity of the hGH gene.

Using a genetically modified mouse model, Nancy E. Cooke, M.D., Stephen A. Liebhaber, M.D., Professors of Genetics and Medicine, and colleagues demonstrated a critical role of two non-coding regions on the activation of the hGH gene. They described their findings in the August issue of *Molecular Cell*.

Synthesized by the pituitary gland, human growth hormone activates growth and cell reproduction. In addition to serving as a major contributor to height increase during childhood, hGH plays a role in strengthening bones and increasing muscle mass throughout life. While mutations to the hGH gene often lead to abnormal growth in children and adults, these mutations have provided researchers with key clues regarding the genomic areas that appear to control expression of the hGH gene.

Previous work in the Cooke and Liebhaber laboratories found that the hGH gene is controlled by a non-coding DNA region, or locus control region. Remarkably, this region is located more than 14,000 base pairs away from the hGH gene. At the genomic level, a 14,000 base-pair separation is equal to the size of 10 growth hormone genes lined end to end. "The effects of the locus control region on human growth hormone expression is as if you turn a key in the lock of a house at one end of your street and find that this action

Nancy E. Cooke is a Professor of Medicine in the Division of Endocrinology, Diabetes, and Metabolism at the University of Pennsylvania. She received her B.S. in Chemistry from Wellesley College and Case Western Reserve University, and her M.D. from Case Western Reserve University School of Medicine. Before coming to the University of Pennsylvania in 1982 she was a resident in Medicine at Barnes Hospital, Washington University; a Clinical Fellow in Endocrinology and Metabolism at Washington University School of Medicine; a Research Associate in the Howard Hughes Medical Institute, Department of Biochemistry, University of California San Francisco, and an Assistant Professor in the Department of Medicine, University of California San Francisco.

In addition to numerous textbook contributions and lecture invitations, Cooke has authored or co-authored over 70 publications. Research in her laboratory focuses on molecular endocrinology. Specifically, her lab studies the mechanisms involved in the regulation of growth hormone gene expression.

Dr. Nancy Cooke

Dr. Stephen Liebhaber

Stephen A. Liebhaber is a Professor of Genetics and Medicine at the University of Pennsylvania. He also serves as Chair of the Oversight Committee of the DNA Sequencing and Analysis Core and Co-director (with Cooke) of the School of Medicine's Transgenic and Chimeric Mouse Facility. Liebhaber received his B.A. in Chemistry from Brandeis University in 1968 and his M.D. from Yale University in 1972. Prior to joining the faculty of the University of Pennsylvania in 1982, Liebhaber did an internship in Internal Medicine at Cleveland Metropolitan General Hospital and was a Resident at the University of Colorado Medical Center and Barnes Hospital in St. Louis, Missouri. He also held fellowships at Washington University in St. Louis, Missouri, and the University of California, San Francisco, where he eventually became an Assistant Professor.

Liebhaber has been active on numerous academic committees at the University of Pennsylvania and has held several editorial positions, including serving on the Editorial Board of *The Journal of Biological Chemistry*. He is currently studying the roles of chromatin structure and epigenetic controls in eukaryotic gene activation, and the roles of mRNA-protein interactions in controlling eukaryotic mRNA stability and expression.

opens the lock and door of a house a block away," notes Liebhaber.

By carefully analyzing the 14,000 base pairs separating the hGH gene and its locus control region, co-authors Yugong Ho, Ph.D., an Instructor of Genetics at Penn and a Cooke/Liebhaber lab member, and Felice Elefant, Ph.D., Assistant Professor at Drexel University and former member of the Cooke/Liebhaber lab, found that the locus control region was copied into RNA, and discovered a gene called CD79b within this region. Remarkably this CD79b gene was also copied into RNA in the pituitary. While the CD79b gene normally codes for a protein in blood lymphocytes, researchers discovered that CD79b appears to play a very different role in the pituitary gland. Here, CD79b was actively transcribed into mRNA, but this mRNA failed to translate into a functional protein. Instead, the non-coding RNA was suspected to play a role in hGH gene regulation.

In order to determine whether the CD79b RNA in the pituitary gland served a function, the researchers inserted a segment of human DNA that included hGH, the hGH locus control region, and CD79b into a group of mice. As a result, the transgenic mice expressed high levels of human growth hormone in the pituitary, as well as, mouse growth hormone. To test whether the transcription of the locus control region and CD79b played a significant role in hGH expression in transgenic mice, they then inserted a piece of DNA into the locus control region. This DNA insertion specifically blocked the copying of the CD79b gene into RNA in the pituitary. This blockade led to the five-fold repression of hGH gene expression. These findings confirm that the CD79b non-coding DNA actively contributes to hGH expression. The relationship between CD79b, the hGH locus control region, and the hGH gene may aid researchers in the development of treatments for patients suffering from hGH deficiency.

Chemical continued

Continued from page 17

tance to several classes of antibiotics. Heike Brötz-Oesterhelt (AiCuris Pharmaceuticals) will describe a natural product that kills bacteria by allosteric hyperactivation of a bacterial proteasome-like machine, an unprecedented mechanism for an antibiotic.

Natural products, the structurally complex secondary metabolites found throughout phylogeny, have long been exploited as drugs and as tools for cell biologists. What is the extent of "protein target space" accessible to small molecule natural products, given the constraints of evolution by natural selection? Several talks throughout the Chemical Biology theme, including two in the Chemical and Cell Biology of Natural Products session, expand the known protein target space of natural products in exciting ways. Jun Liu (Johns Hopkins Medical School) will discuss a natural product that blocks translation not by targeting the ribosome, but by allosterically modulating an initiation factor, which leads to the assembly of stalled initiation complexes. Jack Taunton (UC San Francisco) will describe a cyclic peptide that blocks secretion of a small subset of human proteins. It does so by preventing certain secretory proteins from opening the translocation channel in the endoplasmic reticulum membrane, an unprecedented mode of protein regulation. Finally, Christopher Walsh (Harvard Medical School) will describe how natural products, in all their ornate glory, are biosynthesized. His talk will illuminate not only the major assembly steps, but also the key tailoring chemistries that are essential for biological activity. Knowledge of this chemistry will enable the rational programming of "unnatural" natural products with superior pharmacological properties.

What Do You Want to Be When You Grow Up?

"What do you want to be when you grow up?" is a question that is common and, depending on the stage of one's academic development, often frequent. As a young child, my response was always, "A doctor." My mother says that when I was about 4 years old, I was at the hospital with my brother and a boy, probably 12 years old, with a prosthetic leg, was pushed past me in a wheel chair. I stared at the boy, then turned to my mother and said, "When I grow up I will find a way to fix that boy." Clearly, from an early age I had an interest in medicine and a desire to help people. By high school, after an exceptional elementary and middle school curriculum filled with physiology and small animal dissections, "A cardiac surgeon" became my new answer to the familiar question. I was lucky enough to have a close family friend and physician, Dennis Devereaux, take me under his wing. He brought me to see a number of different surgeries in order to assess my interest. I remember these times well, standing for over 8 hours in the surgical theater of the Brigham and Women's Hospital in Boston, watching a mitral valve replacement procedure. It was captivating. I remember thinking, "This is the job for me!"

But I was young, and when I got to college things changed. I took a genetics class that would alter my "age-old" view that physiology was the key to helping people and make me realize that one could identify the underlying causes of diseases – mutations in our genome. I immediately went out and got a part-time job as a technician in a lab involved in cardiovascular research. The unique aspect of this lab was that the M.D.s associated with a cardiovascular clinical practice were required to do a rotation in this lab. Therefore, it allowed me to experience a translational environment – new drugs that demonstrated positive results in the lab could be transferred to the clinic. This was my first encounter with the drug discovery process. This was a few steps beyond mapping a gene to a particular disease locus; it was closer to the clinic.

Now it was becoming clear to me that medical school was not my only option and that a Ph.D. was a viable alternative. A major deterrent to going to medical school was the cost. The prospect of paying off student loans years after I finished school was not appealing to me. I was even more convinced that a Ph.D. was the way to go when I learned that I would be paid to go to graduate school. But I still had the desire to do something related to medicine, something translational. I decided to do my Ph.D. at The University of Massachusetts Medical School. Enter my mentor, Allan Jacobson. Allan has a unique style. He's not pushy, but he's certainly interested. "What do you want to be when you grow up?" he would ask me. I knew I wanted to pursue a career in industry, as opposed to the University Professor basic science career path and, at this point in my career, my image of "Big Pharma" did not include the word "cutting-edge." I envisioned this particular industrial sector as more like working for an airline or for the Army; in other words, I worried about being pigeonholed into one aspect of the drug discovery process and not being exposed to the entire process. For me, this was not a viable option. I needed to be in an environment that was fast paced, and I needed to work on something that could translate into the clinic.

Dr. Ellen Welch

Now the $64,000 question: Was I able to find a job that satisfied my criteria? Surprisingly enough, I did! I now work at a small biotech company, PTC Therapeutics, discovering new drugs that will someday be used to treat people with a number of different genetic disorders. It's cutting-edge and small enough to allow a scientist like myself to be involved throughout the entire drug discovery and development process. I reflect back on the choices that got me to where I am now, and I realize that what ultimately influenced me the most was just deciding to do what interests me.

Ellen Welch, Ph.D. is a Group Leader in the Biology Department at PTC Therapeutics, Inc. in South Plainfield, New Jersey, where she identifies new drugs for the treatment of genetic disorders caused by nonsense mutations. In addition, Dr. Welch's group is identifying new drugs for the treatment of Duchenne muscular dystrophy and spinal muscular atrophy. Dr. Welch earned a B.S. in Biology at Northeastern University in Boston and a Ph.D. in Molecular Biology at the University of Massachusetts Medical School in Worcester, MA in Dr. Allan Jacobson's laboratory. She was a postdoctoral researcher in the laboratory of Dr. Stuart Peltz before joining PTC. She can be contacted at ewelch@ptcbio.com.

Scientists Reverse Evolution

University of Utah scientists have shown how evolution works by reversing the process, reconstructing a 530-million-year-old gene by combining key portions of two modern mouse genes that descended from the archaic gene.

"It provides further evidence at the molecular level of how evolution has occurred and is occurring, and thus makes the process less mysterious," says Mario Capecchi, Distinguished Professor and Co-Chairman of Human Genetics at the University of Utah School of Medicine and an investigator with the Howard Hughes Medical Institute." We've shown some of the elements involved in the process of evolution by reversing this process and reconstructing a gene that later became two genes," he adds.

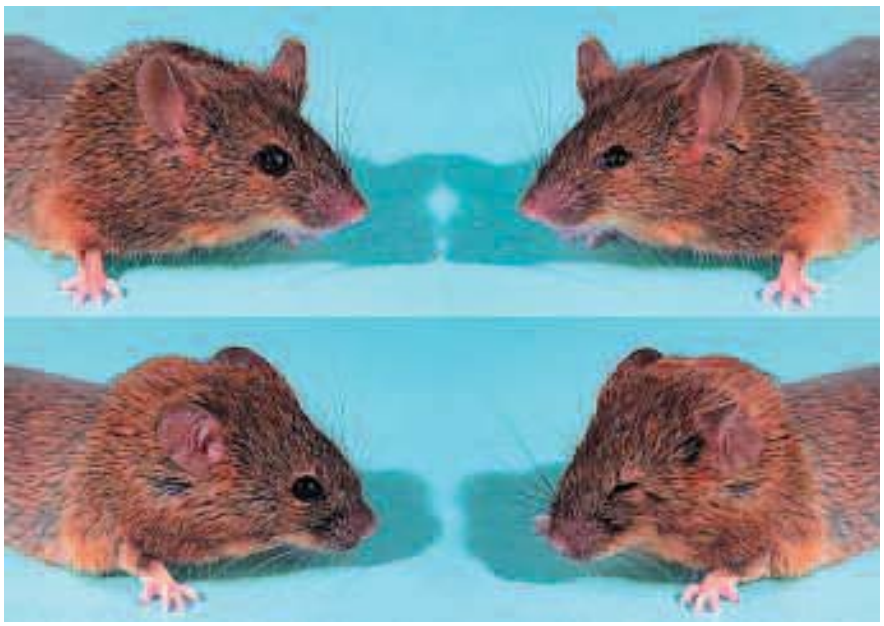
The study by Capecchi and postdoctoral fellow Petr Tvrdik was published in the August issue of the journal *Developmental Cell*.

The process of one gene splitting into multiple genes, which then mutate, "has occurred many times in evolution, but no one has put it back together again," Tvrdik says. "We are first to reconstruct an ancient gene…We have proven that, from two specialized modern genes, we can reconstruct the ancient gene they split off from. It illuminates the mechanisms and processes that evolution uses, and tells us more about how Mother Nature engineers life."

The study involved Hox genes, which function in patterning the body axis during development. Until sometime between 530 million and 480 million years ago, early animals had 13 Hox genes. Then, in jawed fish – the last common ancestors of modern vertebrate animals – each Hox gene split into four, so 13 became 52. Later, duplicate Hox genes either mutated in a way that proved useful, or vanished because they were redundant, so today in humans and other mammals there are 39 instead of 52 Hox genes.

Capecchi's study focused on two modern Hox genes, the Hoxa1 gene,

Continued on page 25



Mice in which the Hoxb1 gene has been disabled are unable to blink their eyes when air is blown into their faces (top). This effect is reversed by inserting a key piece of the Hoxb1 gene into the Hoxa1 gene (bottom). Photo Credit: Petr Tvrdik

ASBMB member Mario R. Capecchi is Professor of Biology at the University of Utah and Professor of Human Genetics, Adjunct Professor of Oncological Sciences, and Co-chairman of the Department of Human Genetics at the University of Utah School of Medicine. He is also an investigator at the Howard Hughes Medical Institute. He earned his B.S. from Antioch College in 1961 and his Ph.D. from Harvard University in 1967. After a fellowship at Harvard University, he joined the Harvard staff as Assistant Professor in 1969. In 1971 he became Associate Professor.

A member of numerous societies and editorial boards, including the National Academy of Sciences and the American Academy of Microbiology, Capecchi has authored or co-authored over 141 publications. He is especially known for developing technology of gene targeting in mouse embryo-derived stem (ES) cells, allowing scientists to manipulate the DNA sequences in the genome of living mice. Capecchi has received many honors and awards for his work. These include the 1998 Baxter Award for Distinguished Research in the Biomedical Sciences, the 2001 National Medal of Science, and the 2005 March of Dimes Prize in Developmental Biology.

Mitochondrial Protein Has

Scientists at the University of California, Los Angeles have discovered that the putative acyl transferase, tafazzin, is lodged in both the inner and outer mitochondrial membranes without poking fully through either one. They also found that point mutations that cause mislocalization of the protein within mitochondria or alter its macromolecular interactions cause Barth syndrome, a rare condition that damages the heart, immune system and mitochondria of young boys.

Carla Koehler, a UCLA associate professor of chemistry and biochemistry, and Steven Claypool, a UCLA postdoctoral scholar in chemistry and biochemistry, report their findings in a paper published in the July 31 issue of the *Journal of Cell Biology*.

Koehler and Claypool are the first to elucidate the location of tafazzin in normal cells and in cells from patients with Barth syndrome. Using the yeast tafazzin protein (Taz1p), the authors found that normally, Taz1p localizes to the inner and outer membranes of the mitochondria, but only to the leaflets that face the intermembrane space. A central loop in the Taz1p protein inserts into the membranes but does not extend all of the way through the membrane. The bulk of Taz1p protrudes into the intermembrane space.

"We have shown that tafazzin normally associates with both the outer membrane and the inner membrane, always facing the intermembrane space," Claypool said. "Tafazzin protrudes into the intermembrane space from both the outer and inner membranes."

The authors also looked at the effects of four of the disease-causing point mutations in tafazzin that lay in the putative membrane anchor loop. Introduction of the mutations into Taz1p altered its association with the membrane. "Three of the mutations were mislocalized to the mitochondrial matrix; the fourth mutation we characterized localized normally but was assembled inappropriately," Claypool said. "The mislocalization or misassembly of these mutants disturbed the dance of biology and inactivated tafazzin's function."

Three years ago, when Claypool joined Koehler's laboratory after earning his Ph.D. in immunology from Harvard, almost nothing was known about the tafazzin protein.

Koehler and Claypool believe the tafazzin protein may be associated with cardiolipin, the signature lipid of

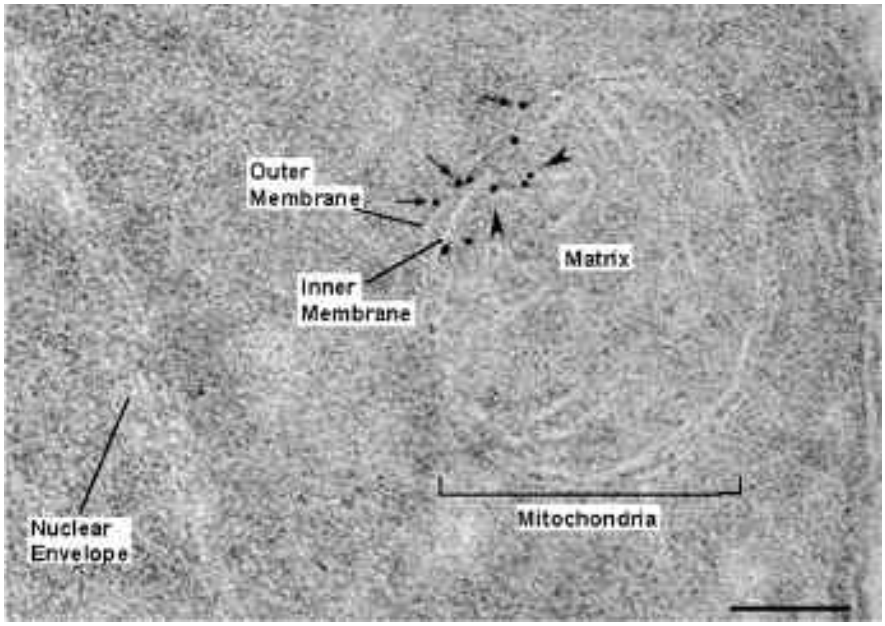
Dr. Carla Koehler and Dr. Steven Claypool

Carla M. Koehler is an Associate Professor in the Department of Chemistry and Biochemistry at the University of California, Los Angeles and member of the Molecular Biology Institute, the Brain Research Institute, and the Jonsson Comprehensive Cancer Center. She received her B.S. in Biochemistry, M.S. in Biochemistry and Molecular Biology, and Ph.D. in Biochemistry and Molecular Biology from Iowa State University in 1986, 1989, and 1995, respectively. After a four-year post-doctoral fellowship in Switzerland, she joined the faculty of UCLA as Assistant Professor.

Koehler has authored or co-authored over 43 publications and is a member of several professional societies. She is also the recipient of many fellowships and awards, including a Burroughs Wellcome Fund Young Investigator Award in Toxicological Sciences and a Scholar Award from the Damon Runyon Cancer Research Fund, and has participated in various scientific conferences and workshops. Her research focuses on protein import into mitochondria, as well as the role of mitochondrial biogenesis in cellular functions and disease.

Steven Michael Claypool is a postdoctoral fellow in the Department of Chemistry and Biochemistry at the University of California, Los Angeles. He received his B.A. in Biological Sciences and M.A. in Molecular, Cellular, and Developmental Biology from the University of California, Santa Barbara in 1995 and 1996, respectively. In 2003 Claypool earned his Ph.D. in immunology from Harvard University and started work at UCLA. A member of several societies, Claypool is an avid lecturer and is a recipient of the Western States Affiliate Research Committee of the American Heart Association Postdoctoral Fellowship award. His research focuses on the mitochondrial components of lipid metabolism, and seeks an understanding of lipid biogenesis and the transport that occurs in the mitochondria.

Unusual Location



An electron micrograph with Taz1 labeled by immunogold. Figure credit: J. Michael McCaffery.

mitochondria, which has been implicated in other diseases, including those of the heart.

"In cardiac disease, mitochondria often malfunction," Koehler said. "Cardiolipin is an important lipid in this process; if it becomes damaged, the mitochondria become leaky and do not function as well. Tafazzin may be important in repairing lipids, including cardiolipin, but we have not shown that yet."

Scientists Reverse Evolution continued...

Continued from page 23

which helps control how an embryo's brain stem develops and is compartmentalized into seven sections called rhombomeres, and the Hoxb1 gene, which orders the formation of particular nerve cells in rhombomere 4—nerves that ultimately control facial expressions in animals.

A key question was whether the Hoxa1 and Hoxb1 genes are different because their protein-coding regions have changed or their regulatory sequences have changed. So the scientists switched the two genes' coding regions. Each gene then produced the other gene's protein. Mice born with the switched genes were essentially normal, showing that the coding regions were interchangeable, and that evolution changed each gene's regulatory sequence.

Next, Tvrdik and Capecchi took a small portion of the regulatory sequence from the Hoxb1 gene (which controls facial expressions) and put it into Hoxa1, (which allows mice to breathe and survive after birth). They then inserted this gene into mice whose Hoxb1 had been disabled. To their surprise, the researches discovered that the new gene performed the jobs of both genes. Mice born with the combined gene still were able to breathe and survive thanks to the Hoxa1 gene, and they could move their facial muscles, thanks to the small bit of the Hoxb1's regulatory sequence.

Capecchi says that by combining parts of both Hoxa1 and Hoxb1, he and Tvrdik reversed evolution. "What we have done is essentially go back in time to when Hox1 did what Hoxa1 and Hoxb1 do today," he says. "It gives a real example of how evolution works because we can reverse it."

Australian Society for Medical Science Honors Bill Brinkley

The Australian Society for Medical Research (ASMR) selected Dr. William R. Brinkley, Senior VP and Dean of the Graduate School of Biomedical Sciences, Baylor College of Medicine, as its 2006 Medalist. Each year, in celebration of Medical Research Week, the ASMR recognizes one individual, worldwide, who has contributed significantly to the promotion of health and medical research. Brinkley, a member of ASBMB, received the medal and presented a nationally televised lecture at the Australian National Press Club in Canberra on June 8. The lecture was attended by

Dr. Brinkley addressing Australian National Press Club in Canberra.

members of the government and leaders of the medical research community throughout Australia, and was televised nationwide. During the visit, he lectured in Australia's major cities including Brisbane, Adelaide, Canberra, Sydney, Melbourne and Perth.

Dr. Brinkley, a member of the Board of Directors of Research!America and Chairman of ASBMB's Public Affairs Advisory Committee, was honored for his tireless efforts as an advocate and spokesman for the promotion of biomedical research funding in America. He was selected for his leadership in the advocacy for legislation in the U.S. Congress supporting a 5-year campaign to double the research budget for the National Institutes of Health (NIH), which was completed in 2003. In recognition of Australia's successful campaign to double its own Health and Medical Research funding this year, Brinkley's lecture was entitled "Celebrating Health and Medical Research in Australia: A Renaissance for Discovery and Opportunity."

Jack Dixon to Join HHMI

The Trustees of the Howard Hughes Medical Institute have elected Jack E. Dixon as Vice President and Chief Scientific Officer. His appointment is effective February 1, 2007.

Dixon, currently a member of the Institute's Medical Advisory Board, will play major roles both in HHMI's flagship investigator program and in identifying new opportunities that capitalize on the Institute's expertise in biomedical research and science education.

Dr. Jack Dixon

"I have done discovery research for better than 30 years," said Dixon. "The opportunity to work for an organization that can affect science and science education around the world is really appealing."

Dixon is currently Dean of Scientific Affairs at the University of California, San Diego, School of Medicine. He will continue to maintain a laboratory at UCSD, where he is also Professor of Pharmacology, Cellular and Molecular Medicine, Chemistry, and Biochemistry. "I think you can be a better scientific leader if your feet are on the ground and you are dealing with the same things as the investigators," he said.

Throughout his career, Dixon has been actively involved in the American Society for Biochemistry and Molecular Biology. In 1996 he served as President of the Society and in 2005 he received the American Society for Biochemistry and Molecular Biology-Merck award.

E. Richard Stanley Receives 2006 E. Donnall Thomas Prize

E. Richard Stanley, Professor and Chair of Developmental and Molecular Biology at Albert Einstein College of Medicine of Yeshiva University, has been selected to receive the 2006 E. Donnall Thomas Prize, presented annually by the American Society of Hematology.

The Prize, which was established in 1992, recognizes a researcher whose ground-breaking work has contributed significantly to the field of hematology. In conjunction with receiving the honor, Stanley will present the E. Donnall Thomas Lecture at the Society's annual meeting in December in Orlando, Florida.

For more than a quarter-century, Dr. Stanley has pioneered studies of the biology and action of the growth factor called Colony Stimulating Factor-1 (CSF-1). He isolated and identified CSF-1 as the primary regulator of tissue macrophage and osteoclast production. He defined its receptor, physiology and roles in development and cancer. He identified and elucidated the function of several intracellular signaling molecules that act downstream of the CSF-1 receptor. He and his colleagues established several mouse models to investigate the roles of CSF-1 and the CSF-1 receptor in development and in diseases that include leukemia, solid tumors, osteoporosis, nephritis and atherosclerosis. His studies also have furthered general understanding of the role of growth factors in regulation of cell proliferation, differentiation and function.

Dr. E. Richard Stanley

Harel Weinstein to Become President of Biophysical Society

Harel Weinstein has been elected President-elect of the Biophysical Society. He will assume the office of president-elect at the Society's 2007 Annual Meeting in Baltimore, Maryland, and begin his term as President during the 2008 Annual Meeting in Long Beach, California.

Dr.Harel Weinstein

Weinstein is the Maxwell Upson Professor of Physiology and Biophysics, Chairman of the Department of Physiology and Biophysics, and Director of the Institute for Computational Biomedicine at Weill Medical College of Cornell University. He is also a Tri-Institutional Professor at Rockefeller University, Sloan-Kettering Institute and Cornell University. Weinstein received his B.Sc. in Chemistry, his M.Sc. in Quantum Chemistry, and his D.Sc. in Theoretical Physical Chemistry at the Technion-Israel Institute of Technology.

The Biophysical Society, founded in 1956, is a professional, scientific society established to encourage development and dissemination of knowledge in biophysics. The Society promotes growth in this expanding field through its annual meeting, monthly journal, and committee and outreach activities. Its members are located throughout the world, where they teach and conduct research in colleges, universities, laboratories, government agencies, and industry.

Robert K. Yu Selected President-Elect of Bioscientists Society

Robert K. Yu, director of the Institute of Molecular Medicine and Genetics and the Institute of Neuroscience at the Medical College of Georgia, has been elected president-elect of the Society of Chinese Bioscientists in America. Yu, who is the Georgia Research Alliance Eminent Scholar in Molecular and Cellular Neurobiology, will assume the presidency of the 2,800-member organization in January 2008.

Yu is founding president of the Society for Chinese Neuroscientists in America and former president of the American Society for Neurochemistry. He is a lifelong academician of Academia Sinica, the Republic of China's premier academic institution, and a member of the advisory board of the Academy's Institute of Biological Chemistry. He was recently appointed to Georgia's Commission for Newborn Umbilical Cord Blood Research and Treatment.

Dr. Robert K. Yu

Yu has been actively involved in ASBMB affairs. He is an Associate Editor and a member of the Editorial Board of the *Journal of Lipid Research* and a member of the Editorial Board of the *Journal of Biological Chemistry*.

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.

Rhonda Clark, Oklahoma University Health Sciences Center

Udayan Dutta, University of Massachusetts Medical School

Department Heads Take Note:

ASBMB Offers Free Membership to New Ph.D.s

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

Membership in ASBMB brings with it a free subscription to the online versions of the Journal of Biological Chemistry and Molecular and Cellular Proteomics, and ASBMB Today.

In addition, we are asking department chairs to provide ASBMB with the names and addresses of each new Ph.D. recipient from their institutions, so that we can congratulate them on their accomplishment and offer them the free one-year membership in ASBMB.

Please email to: membership@asbmb.org or visit www.asbmb.org for more information.

By Nicole Kresge, Science Editor

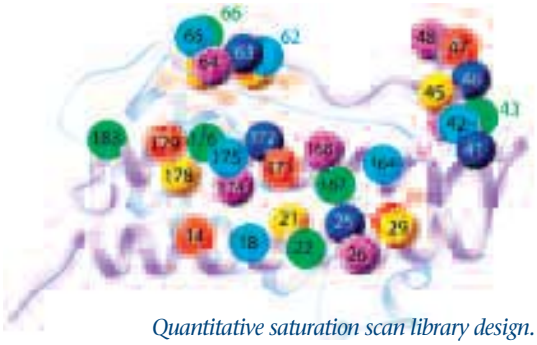
ASBMB Bio Bits

Comprehensive and Quantitative Mapping of Energy Landscapes for Protein-Protein Interactions by Rapid Combinatorial Scanning

Gábor Pál, Jean-Louis K. Kouadio, Dean R. Artis, Anthony A. Kossiakoff, and Sachdev S. Sidhu

J. Biol. Chem. 2006 281: 22378-22385.

Protein-protein interactions are often characterized by a striking structural plasticity that allows contact points to adapt to conformational changes and multiple amino acid substitutions. As a result, the biophysics governing protein-protein interactions is extremely complex, and an area of extensive investigation is concerned with establishing a detailed knowledge base that will enhance our understanding of protein-protein associations and enable the development of predictive criteria for engineering novel protein functions. To aid this effort, the authors of this paper have developed a novel combinatorial quantitative saturation scanning strategy that enables rapid assessment of the structural and functional effects of all possible mutations across a large protein-protein interface. The researchers applied their scan to the interaction between human growth hormone and its receptor. They found that the human growth hormone binding interface is highly adaptable to mutations, but that the nature of the tolerated mutations challenges generally accepted views about the evolutionary and biophysical pressures governing protein-protein interactions.



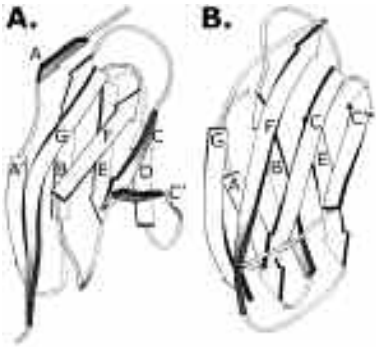
Quantitative saturation scan library design.

Using Model Proteins to Quantify the Effects of Pathogenic Mutations in Ig-like Proteins

Lucy G. Randles, Ilkka Lappalainen, Susan B. Fowler, Benjamin Moore, Stefan J. Hamill, and Jane Clarke

J. Biol. Chem. 2006 281: 24216-24226.

Is it possible to predict how changes in sequence will affect the biophysical properties of a protein? In this study, the authors attempt to answer this question by using stable, well characterized model proteins to predict the properties of disease-associated proteins in the same structural family. Using related model proteins in which identical or equivalent mutations had been introduced, Randles et al. analyzed 37 different disease-causing mutations located in the L1 and IL2Rγ proteins. Their results show an extremely strong correlation between protein instability and disease. However, there are a few exceptions, which clearly indicate the limitations of the approach. The correlation is obtained by relating the sequence variability to the energies of interaction rather than to sequence entropy. This establishes the importance of protein energetics and strikes down the sequence entropy as a measure of stability. The paper leads to the conclusion that sequence entropy as a measure of sequence variability is not useful for relating to protein structure.

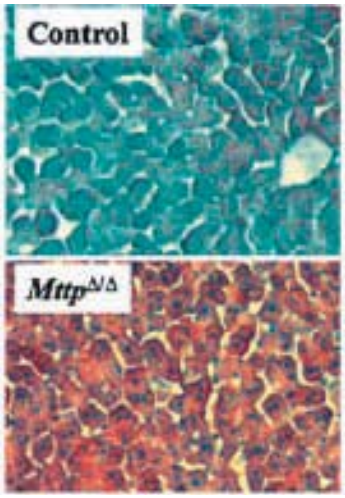


Structures of model Ig and fnIII proteins.

Absence of VLDL secretion does not affect α-tocopherol content in peripheral tissues

Kaori Minehira-Castelli, Scott W. Leonard, Quinn M. Walker, Maret G. Traber, and Stephen G. Young

J. Lipid Res. 2006 47: 1733-1738.



Vitamin E (tocopherols and tocotrienols) is a lipid-soluble antioxidant that helps to prevent oxidative damage to cellular lipids. α–Tocopherol is absorbed by the intestine and is taken up and retained by the liver. It is widely believed that α–tocopherol is then packaged in newly assembled Very Low Density Lipoprotein (VLDL) and secreted in this form, whereupon it is delivered to peripheral tissues. To determine whether VLDL secretion is truly important for the delivery of α–tocopherol to peripheral tissues, the authors examined α–tocopherol metabolism in mice that cannot secrete VLDL. They found that α–tocopherol levels in the plasma were lower in the mutant mice than in controls, whereas hepatic α–tocopherol stores were higher. However, α–tocopherol levels in the peripheral tissues of the genetically altered mice were nearly identical to those of control mice, suggesting that VLDL secretion is not critical for the delivery of α–tocopherol to peripheral tissues. Thus the authors conclude that the absence of VLDL secretion has little effect on the stores of α–tocopherol in peripheral tissues, at least in the mouse.

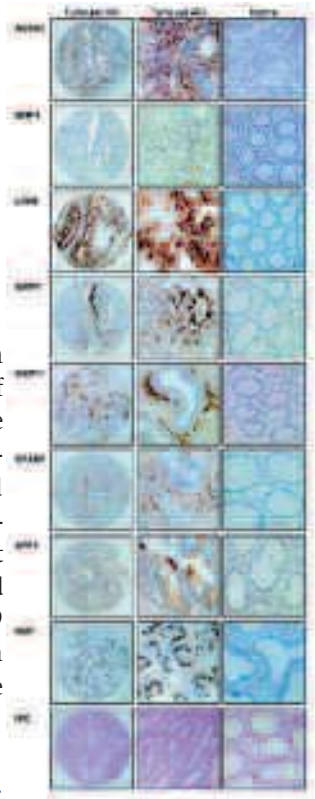
Increased numbers of lipid droplets (red) in hepatocytes of mice unable to secrete VLDL.

Proteomics-based Validation of Genomic Data: Applications in Colorectal Cancer Diagnosis

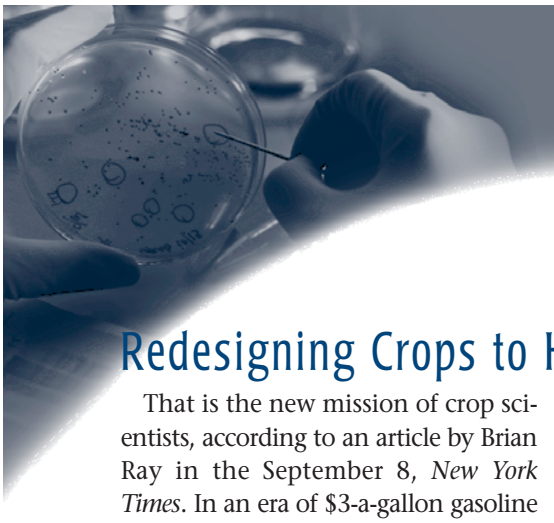
Juan Madoz-Gúrpide, Paula López-Serra, Jorge Luis Martínez-Torrecuadrada, Lydia Sánchez, Luis Lombardía, and J. Ignacio Casal

Mol. Cell. Proteomics 2006 5: 1471-1483.

Traditional methods of identifying novel targets involved in cancer progression have been based on studies of individual genes. Now, the use of DNA microarrays permits the analysis of the expression of tens of thousands of genes simultaneously and rapidly. In this article, the authors investigated the feasibility of expressing soluble proteins corresponding to up-regulated genes in cancer patients with surgically resected colon polyps and tumors. They used cDNA microarrays to identify differentially expressed genes in malignant versus normal samples isolated from individual patients with colorectal cancer. They then investigated different sources of cDNA clones for protein expression, as well as the influence of the protein size and the different tags with respect to protein expression levels and solubility in E. coli. From 29 selected genes, 21 distinct proteins were finally expressed as soluble proteins. In addition, seven of these potential markers were tested for antibody production and/or validation. Six of the seven proteins were confirmed to be overexpressed in colorectal tumoral tissues.



Tissue microarray analysis of selected targets in colorectal cancer.



by John D. Thompson, Editor

Redesigning Crops to Harvest Fuel and Get More Miles to the Bushel

That is the new mission of crop scientists, according to an article by Brian Ray in the September 8, *New York Times*. In an era of $3-a-gallon gasoline and growing concern about global warming from fossil fuels, seed and biotechnology companies see a promising opportunity in developing corn and other crops tailored for use in ethanol and other biofuels.

Syngenta, for instance, hopes in 2008 to begin selling a genetically engineered corn designed to help convert itself into ethanol. Each kernel of this self-processing corn contains an enzyme that must otherwise be added separately at the ethanol factory. And just last month, DuPont and Bunge announced that their joint venture to improve soybeans for food would also start designing beans for biodiesel fuel and other industrial uses. Meanwhile Ceres, a plant genetics company in California, is working to turn switch grass, a Prairie States native, into an energy crop.

Developing energy crops could mean new applications of genetic engineering, which poses a concern to some environmentalists who worry that altered plants will cross-pollinate in the wild, resulting in forests that practically droop for want of lignin. However, proponents of designer fuel crops argue that the risks are small compared with those of dependence on foreign oil.

So far, much of the attention on bioenergy has focused on improving the chemical processes for turning crops into ethanol. But experts say that, if biofuels are to make a significant dent in the nation's petroleum consumption, the crops themselves must be improved to provide more energy per acre. Even if the nation's entire corn crop were diverted to ethanol production, it would replace only about 15% of petroleum use, according to an Energy Department report.

Not all of the work will involve genetic engineering. Monsanto's biofuel development will focus on conventional breeding, which it says is quicker. The company has tested its existing corn varieties to determine which ones are better for ethanol production. Pioneer Hi-Bred International, the DuPont subsidiary that is Monsanto's rival in the corn-seed business, is doing the same.

Regardless of what is done to corn, some experts say that starch alone will not provide enough ethanol. The new frontier is to produce ethanol from cellulose, the fibrous material in all plants.

While some of the cellulose for biofuels could come from agricultural residue like corn stalks, there will probably be a need for other crops grown specifically for energy production — in particular, perennial plants like grasses that require far less energy-consuming irrigation and fertilization than crops like corn that have to be replanted each year.

Ceres, based in Thousand Oaks, California, is collaborating with the Samuel Roberts Noble Foundation in Ardmore, Okla., a leading research institute on forage grasses. The partners are testing conventionally bred switch grass varieties that yield eight to nine tons of biomass an acre, compared with about five tons for typical switch grass.

Another cellulose candidate is poplar, which recently became the first tree to have its entire genome sequenced, an effort led by the Energy Department.

PhRMA Reportedly Funded Ads Touting Medicare Prescription Drug Benefit

"Political officials" allege that the Pharmaceutical Research and Manufacturers of America (PhRMA) gave money to the U.S. Chamber of Commerce to support an advertising campaign that praised senators and House members who voted for the 2003 Medicare law, according to the AP/San Jose Mercury News reports.

The $10 million campaign launched in July and includes radio and television ads. According to the AP/Mercury News, "officials who described PhRMA's involvement said they did not know whether the industry had given the Chamber money to cover the entire cost of the ads and other elements of an election-year voter mobilization effort or merely a portion." As of late August, the campaign ads were airing in 10 states or congressional districts and had been removed in other areas because of errors. An ad supporting Rep. Steve Chabot (R-Ohio) was removed because he voted against the 2003 Medicare law, and ads supporting Reps. Michael Fitzpatrick (R-Pa.), Mike Sodrel (R-Ind.) and Dave Reichert (R-Wash.) were removed after Democrats noted that the lawmakers were not in Congress when the law passed.

Senators Critical of Firm's Stem Cell Research Claim

A company that claimed it developed a way to harvest stem cells from days-old human embryos without harming the embryos was accused last month at a Senate hearing of misrepresenting its work. Advanced Cell Technology Inc. of Alameda, California, drew fire from Senators Arlen Specter, R-Pa., and Tom Harkin, D-Iowa., authors of a bill vetoed by President Bush that would have expanded embryonic stem cell research through government funding.

Supporters of such research say it could lead to treatments and cures for a wide variety of ailments, including Alzheimer's and Parkinson's disease and spinal cord injuries. Bush and abortion foes, however, have opposed embryonic stem cell research because the embryos die in the process of harvesting the stem cells from them.

Advanced Cell Technology said last month it had developed a technique for removing from an embryo a single stem cell that can be developed into a stem cell line without destroying the embryo. The company's claim was echoed in an initial e-mail to reporters from *Nature* magazine. Later, however, it was disclosed that the company had removed more than one stem cell from the embryos it used, killing the embryos.

Specter, Chair of the Senate Subcommittee on Labor, Health, and Human Services, told officials of the company that it had not accomplished "what you told the world … We have representation which created a lot of hopes … and now they appear to be dashed."

Harkin, the top Democrat on the subcommittee, said the confusion could have been avoided if the company had acted more responsibly. "This again points out why, if we don't do this, you're going to have . . . individual companies out there trying to hype things up," he said.

Robert Lanza, the company's vice president for research, defended how it announced the development, saying, "We have developed a technique and we have indeed shown it does work."

China Seeking to Increase Support for Drug Research, Production

The Chinese government will increase investment in the development of new drugs and encourage innovation in domestic pharmaceutical companies, according to Zhang Guobao, Deputy Director of the State Development and Reform Commission. He said that insufficient funding for research and development and a lack of innovation has hampered development of China's pharmaceutical industry, and announced that the commission, which set goals for the nation's 2006-2010 five-year plan, has issued guidelines for the development of the medical and pharmaceutical industries

The guidelines require at least 5% of income from pharmaceutical sales to be reinvested in research and development of medical equipment and major companies, and 3% to be spent on general products. The key areas for developing new drugs will be cancers, cardiovascular and cerebrovascular systems, viral infections, nervous and psychological systems, blood sugar reduction, and senile illnesses.

In addition, the government will establish five large pharmaceutical groups with sales of at least five billion yuan ($625 million U.S.) each and 10 others with sales of three billion yuan ($375 million U.S.) each by 2010.

University of Utah Sees Research Funding Fall by $18 million

The University of Utah's research funds have decreased by more than $18 million this year, according to the school's paper *The Daily Utah Chronicle*. In particular, the university's College of Medicine research income is down by more than $11 million and its College of Engineering experienced a $7 million drop. "The humanities, education, business and social and behavioral science colleges also have had sharp decreases in research awards," the paper noted.

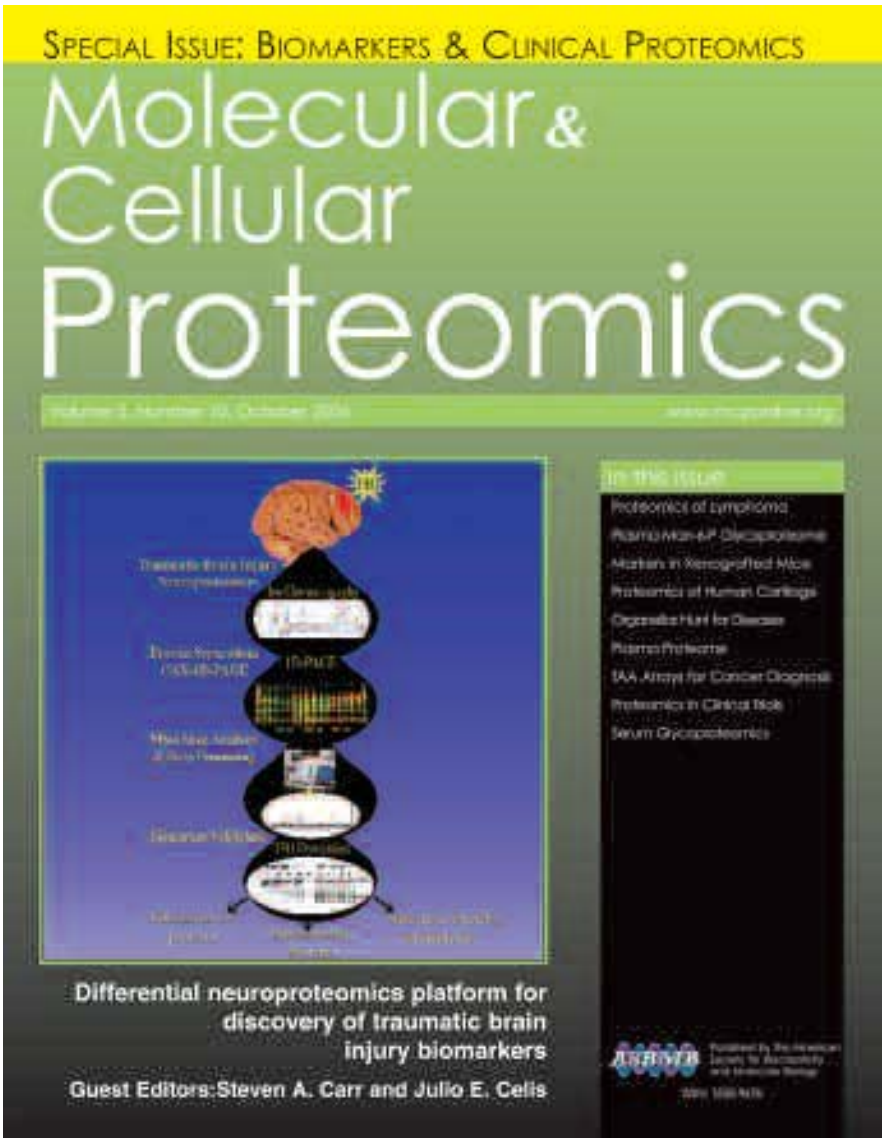
Raymond Gesteland, the university's Vice President for Research, told the *Chronicle* that research dollars have been harder to come by for several years, but the situation has been worse this year. "Money for research has been decreasing for a few years now," he said. "However, this year is a dip for sure and is becoming a general problem across campus." To compete more effectively for research funds, the university is emphasizing interdisciplinary research and developing 'pump priming' programs. "We are creating new programs, including one in the health sciences and the other campus-wide, to help attract more research dollars from outside organizations," Gesteland said.

October MCP: a Special Issue on Clinical Proteomics

The October 2006 issue of *Molecular and Cellular Proteomics* (MCP) will focus specifically on biomarker discovery and clinical proteomics. This is the fourth special clinical issue produced by the Journal, and it is available **FREE** to ASBMB members on the MCP website (www.mcponline.org).

The issue, which was compiled by guest editors Steven A. Carr and Julio E. Celis, contains many invited contributions, derived in part from presentations at the 2005 Asilomar Conference on "Biomarker Discovery and Validation: from Bench to Bedside" organized by Steve Carr and Leigh Anderson. Four research reports selected from direct submissions to the Journal are also included.

The issue is divided into three major sections: Biomarkers of Disease and Conditions; Proteomic Data Analysis; Resources; and Methodologies. The papers address a broad sweep of advances in technologies, sample preparation methods, data analysis approaches, and applications for disease detection and prognosis. Also included is a meeting report on the National Cancer Institute's attempt to stimulate a community effort around production, characterization, and cataloging of antibody reagents useful for early detection, treatment and monitoring of cancer.



Some of the titles that appear in the special issue include: Guilt By Association: The Nuclear Envelope Proteome and Disease; Novel Differential Neuroproteomics Analysis of Traumatic Brain Injury in Rats; Proteomics in Clinical Trials and Practice: Present Uses and Future Promise; and A Platform For Experimental Pattern Recognition.

"Proteomics in its clinical embodiment is poised to become an important medical discipline in the near future, as identification of novel disease biomarkers complemented by an improved understanding of the pathophysiology of disease, has the potential to significantly aid the development of new strategies for the diagnosis and treatment of human disease. Ultimately, this new discipline is expected to lead to a predictive, individualized approach to patient care, and to facilitate the selection of treatment modalities that are most likely to benefit the individual patient," explain Carr and Celis in their editorial.

The two guest editors believe that mass spectrometry and array-based protein and antibody approaches are at the core of a rapidly expanding worldwide effort to find clinically useful protein biomarkers in human tissues and body fluids. However, this effort will involve many challenges that will have to be met by research scientists, clinicians, statisticians, and developers of new technologies. Carr and Celis compiled the October issue of MCP in the hope of stimulating this process.

For Your Lab/For Your Lab/For Your Lab

ACCURATE CHEMICAL CORP.

PBS and PBS-Tween® Tablets

- Quick stir and ready to use
- Save time with easy-dissolve tablets
- No measurements. No pH adjustments
- Stable (3 years room temp.)
- Consistent for routine lab work

Also available in tablet form: pNPP, BBS, NaCl, TBS, EDTA, etc.

Send for complete listing: AccurateChemical.com
info@accuratechemical.com Ph: 800-645-6264 / Fx: 516-997-4948

21ST CENTURY BIOCHEMICALS

Custom Peptides and Antibodies with FREE PEPTIDE SEQUENCING!

Custom affinity purified polyclonal antibodies — $1,675 complete! 21st Century Biochemicals is the ONLY company that sequences every high purity peptide we make! This guarantees that your peptide is correct. Purities to >97%, mg to >100g, phospho, dye-labeled, cyclized peptides and much more. All of our peptides are manufactured in our Marlborough, MA facility by a staff with over 70 years of experience in chemistry, immunology, biochemistry, and cell biology.

For more info, please call 877.217.8238/508.303.8222, e-mail us at info@21stcenturybio.com or visit us at www.21stcenturybio.com

METHYLATION, LTD.

Purified Methyltransferases and Methyl-CHIP Kit

Methylation, Ltd. provides innovative reagents and kits for researchers working on DNA Methylation and with DNA methyltransferases. Featuring the new Methyl-CHIP Kit: a method to specifically trap DNMT on genomic DNA *in situ* and use antibodies to characterize and clone out DNA binding sites. Purified Human DNA Methyltransferases (DNMT1, DNMT2, DNMT3a, DNMT3b1, DNMT3b3), Antibodies to Human DNMTs (CHIP grade), and DNMT inhibitors also available.

Methylation, Ltd.

For more information, please call 386-304-5948, email methylation@aol.com or visit our website www.methylation.net.

EXIQON

microRNA expression profiling

miRCURY™ LNA Array microarray slides incorporate Exiqon's unique Locked Nucleic Acid (LNA™) technology to provide unrivalled sensitivity and excellent mismatch discrimination for short microRNA (miRNA) targets. miRCURY™ LNA Arrays work on less than 1 µg total RNA (no need for microRNA enrichment) labeled using the miRCURY™ Array labeling kit. The miRCURY™ LNA microarray slides can be used in combination with standard microarray slides and microarray analysis instruments and software. Hybridization and wash buffers are included.

More information: Web: www.exiqon.com;
E-mail: support@exiqon.com; Phone: 781-376-4150

CHEMSW, INC.

NEW! White Paper on Best Practices for Managing Lab Chemical Inventory

ChemSW, Inc.'s latest white paper details best practices in chemical inventory management, providing insights to ensure system adoption and successful incorporation into lab processes. Reasons why systems fail and why they succeed are examined, as well as the true costs associated with chemical inventory management and cost savings that result when such a system is optimized for maximum effectiveness.

For your free copy, please call 707-864-0845 or visit http://www.ChemSW.com/whitepapers/bestpractices.htm

BETHYL LABORATORIES, INC.

ANTIBODIES FOR IHC AND ICC...

Bethyl is qualifying over 300 polyclonal antibodies to cell signaling molecules for use with Formalin-Fixed Paraffin-Embedded (FFPE) Tissues and Formalin-Fixed Cells. Antibodies are packaged with ample antibody to stain 50-250 samples depending on optimal antibody concentration and sample type. New — IHC Accessory Kit (Cat. No. IHC-101), provides the reagents and method for sensitive, reliable and economical IHC staining.

Trial size kits available. Visit us at www.bethyl.com

Career Opportunities

BRANDEIS UNIVERSITY

Tenure-track Assistant Professor in Molecular Biology

The Brandeis Biology Department is seeking to fill a tenure-track position in the broad area of eukaryotic gene expression, beginning fall 2007. We are particularly interested in candidates who study mechanistic aspects of transcriptional regulation, with a focus on nucleic acids or chromatin. We are looking to complement existing strengths at Brandeis in post-transcriptional gene regulation, development and function of the nervous system, chromosome structure and function, biophysics and structural biology. We expect that the appointment will be made at the Assistant Professor level, although a more advanced appointment for candidates with exceptional qualifications may be considered. Candidates should have a Ph.D., M.D. or both, as well as postdoctoral experience. First consideration will be given to applications received by 10/15/06. Candidates can submit initial information online at: http://www.bio.brandeis.edu/facultySearch/appFormMB.php.

Applicants should submit a CV, research plan and arrange for three letters of recommendation to be submitted preferably by email to volencenter@courier.brandeis.edu or in hard copy to:

Molecular Biology Search Committee
Department of Biology, MS 008
Brandeis University
415 South Street
Waltham, MA 02454-9110

Brandeis University is an equal opportunity employer, committed to building a culturally diverse intellectual community and strongly encourages applications from women and minorities.

UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

Chair, Department of Biochemistry and Molecular Genetics

The University of Colorado School of Medicine seeks applicants for Chair of the Department of Biochemistry and Molecular Genetics. The Department consists of 17 primary faculty as well as more than 20 secondary faculty members. The Department currently occupies over 35,000 square feet of state-of-the-art research and office space, primarily on the 9th and 10th floors of the newly occupied Research Complex at the new UCHSC Fitzsimons campus. Details are available at the departmental web site: www.uchsc.edu/sm/bbgn/

Research programs include chromatin structure, gene transcription and translation, RNA structure and enzymatic activity, protein structure, protein degradation, signal transduction, cell cycle regulation, bioinformatics and cell fate determination. Department faculty, currently with over eight million dollars in federal funding, houses both the Molecular Biology and the Biochemistry graduate programs. In addition, department faculty draw graduate students from several other programs including: MSTP, Computational Biosciences, Biomolecular Structure and Biomedical Sciences.

The Chair of the Department of Biochemistry and Molecular Genetics reports to the Dean of the School of Medicine and participates with his staff and other departmental chairs in program development, administration, and budgetary planning and implementation. The position requires excellence in teaching, demonstrated administrative leadership and ability, and, in particular, leadership in research and scholarly activity.

The University of Colorado is committed to the recruitment and employment of a diverse faculty. We encourage applications from women and minorities. Review of applications will continue until the position is filled. Applicants should respond by sending a letter of interest and curriculum vitae to:

John C. Cambier, Ph.D.
Ida and Cecil Green Professor and
Chairman of the Department of
Immunology,
Chair, Department of Biochemistry and Molecular Genetics Search Committee
University of Colorado School of Medicine and National Jewish Medical and Research Center, Room K803
1400 Jackson Street, Denver CO 80206
FAX: [303] 270-2325
Email: Durans@NJC.org

The University of Colorado is committed to diversity and equality in education and employment.

THE RADCLIFFE INSTITUTE FOR ADVANCED STUDY AT HARVARD UNIVERSITY

Fellowships

The Radcliffe Institute for Advanced Study at Harvard University awards fully funded fellowships each year. Radcliffe Institute fellowships are designed to support scientists of exceptional promise and demonstrated accomplishment. Scientists, in any field, with a doctorate in the area of the proposed project by December 2005 are eligible to apply. Only scientists who have at least one published article or monograph are eligible to apply.

The stipend amount of $60,000 is meant to compliment sabbatical leave salaries of faculty members. Fellows receive office space, computers and high speed links, and access to libraries and other resources of Harvard University during the fellowship year, which extends from early September 2007 through June 30, 2008. Residence in the Boston area is required as is participation in the Institute community. Fellows are expected to present their work-in-progress and to attend other fellows' events.

For more information, including lists of present and past fellows, visit our Web site at www.radcliffe.edu. Applications are due by December 4th, 2006. Apply on-line or write, call, or e-mail for an application:

Radcliffe Application Office
34 Concord Avenue,
Cambridge, MA 02138
617-496-3048 - science@radcliffe.edu - www.radcliffe.edu

Career Opportunities

Fox Chase Center

Scientific Technician II. Desgn & perform molecular & biological experimental protocols in genetics & protein expression. Req. M.S. in Biochem or rel + 2yrs exp. Must have knowl of protein expression & purification techniques & glycosilation & DNA polymerase activity determination techniques. Send CV to Holly Molle, Fox Chase Cancer Ctr, 333 Cottman Ave, Philadelphia, PA 19111. EOE

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY, CALIFORNIA STATE UNIVERSITY, FULLERTON

Tenure-track Positions in Biochemistry, Analytical Chemistry

CALIFORNIA STATE UNIVERSITY FULLERTON, DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY seeks applicants for tenure track faculty positions in biochemistry and in analytical chemistry, preferably at the Assistant Professor level, to begin August, 2007. Post-doctoral or equivalent research experience is preferred; women and under-represented minority applicants are particularly welcome. A willingness to engage in collaborative research in related fields is desirable.

Successful applicants must have a PhD in biochemistry or chemistry and have the potential to develop vigorous research programs involving undergraduate and graduate (MS) students that attract external funding and lead to refereed publications. Successful candidates must be committed to excellence in teaching a diverse population of students. Primary teaching responsibilities will be in the core lecture and laboratory courses of the discipline at the undergraduate level, and in graduate courses.

Information about the university and department, as well as full information on the advertised positions is available online at http://chemsrvr2.fullerton.edu/.

Applicants should send a detailed curriculum vitae (including names of references), a summary of proposed research, and a summary of teaching philosophy and preferences, and arrange for three letters of recommendation from individuals familiar with their teaching and research potential. Please send these to:

Dr. Maria C. Linder
Chair, Department of Chemistry and Biochemistry
California State University, Fullerton
P.O. Box 6866
Fullerton, CA 92834-6866
Phone: 714-278-3621
FAX: 714-278-5316
Email: mlinder@fullerton.edu

Review of applications will begin on October 1, 2006 and continue until the positions are filled.

Cal State Fullerton is an Affirmative Action/Equal Opportunity/Title IX/ADA Employer

UNIVERSITY OF SOUTH ALABAMA COLLEGE OF MEDICINE

Chair, Department of Biochemistry and Molecular Biology

The University of South Alabama College of Medicine is seeking a Chair for the Department of Biochemistry and Molecular Biology. The successful candidate will be an outstanding, nationally-recognized scientist and academician who will recruit new faculty and set the future direction for the department's research and educational missions. Candidates with a strong record of research in any area related to biochemistry and/or molecular biology will be considered. Excellent interpersonal skills, leadership and commitment to mentoring junior faculty and trainees are essential. Credentials appropriate for the rank of tenured Professor are required. Current research focus in the department includes molecular and cellular signaling; more information is available at: http://southmed.usouthal.edu/com/biochem/. Opportunities for collaboration and program development exist within the institution, including the Center for Lung Biology, the Mitchell Cancer Institute and other departments in the College of Medicine. The department contributes to medical education and to the training of graduate students through the interdisciplinary Ph.D. program in Basic Medical Sciences. The University is located in Mobile on Alabama's Gulf Coast.

Interested applicants should submit a curriculum vitae, names and contact information for at least three references, a statement of research interests and academic vision, and a summary of administrative experience either electronically (mtownsley@usouthal.edu) or by mail: Dr. Mary Townsley, Chair, Biochemistry Chair Search Committee, Dean's office, CSAB 170, University of South Alabama, College of Medicine, Mobile, Alabama 36688. Review of applications will begin October 16, 2006 and continue until the position is filled.

The University of South Alabama is an Affirmative Action/Equal Opportunity Employer.

Calendar of Scientific Meetings

OCTOBER 2006

4th Euro Fed Lipid Congress

October 1–4 • Madrid, Spain
www.eurofedlipid.org/meetings/madrid/index.htm
Email: amoneit@eurofedlipid.org

International Conference of Immunogenomics and Immunomics

October 8–12 • Budapest, Hungary
A joint meeting of 2nd Basic and Clinical Immunogenomics and 3rd Immunoinformatics (Immunomics) Conferences
Email: diamond@diamond-congress.hu; www.bcii2006.org

3rd Annual Scientific Forum of the Midwest Lipid Association

October 20–22 • Kansas City, MO
www.lipid.org/chapters/mwla; Email: ssheridan@lipid.org

Asilomar Conference on Mass Spectrometry

October 20-24 • Asilomar Conference Center, Pacific Grove, CA
Fundamentals of Gas Phase Ion Chemistry: Experiment and Theory
Program Chairs: Frantisek Turecek and Thomas Morton
For information contact: ASMS
Ph: 505-989-4517; Email: asms@asms.org; www.asms.org

FEBS Special Meeting: European Lipidomics Initiative

October 21–25 • Noordwijkerhout, The Netherlands
www.febslipid2006.chem.uu.nl/

4th International Conference on Structural Genomics

October 22–26 • Beijing, China
Website: www.sino-meetings.com/icsg2006/

NHUPO 5th Annual World Congress

October 28–November 1 • Long Beach, CA
www.hupo2006.com; E-mail: Wehbeh.Barghachie@mcgill.ca
Ph: 514-398-5063

The Liver Meeting 2006— 57th Annual Meeting of the American Association for the Study of Liver Disease

October 27–31 • Boston, MA
www.aasld.org/eweb/DynamicPage.aspx?webcode=2006_AnnualMeeting

NOVEMBER 2006

Transcriptional Regulation by Chromatin and RNA Polymerase I I

November 2–6 • Kiawah Island, South Carolina
Organizer: Ali Shilatifard, Saint Louis, University School of Medicine, Email: shilatia@slu.edu

43rd Japanese Peptide Symposium/4th Peptide Engineering Meeting

November 5–8 • Yokohama, Japan
www.peptide-soc.jp/43JPS4PEM.html
E-mail: hmihara@bio.titech.ac.jp

Fall Workshop: The Present and Future of Quadrupole Ion Trap Mass Spectrometry

November 9-10 • Catamaran Resort, San Diego
Program Chairs: Victor Ryzhov and Richard Vachet
For information contact: ASMS
505-989-4517; asms@asms.org; www.asms.org

NIH 4th Symposium — Functional Genomics of Critical Illness and Injury
Surviving Stress: Organ Systems to Molecules

November 13-14 • Bethesda, Maryland,
Preliminary agenda and detailed guidelines for abstracts are available at: www.strategicresults.com/fg4
Register online through Thursday, October 19. There will be no on-site registration.
Deadline for abstract submission is September 8.

Annual meeting of the Society for Glycobiology

November 15-18 • Los Angeles
Contacts: Linda Baum, President; lbaum@mednet.ucla.edu
Kelley Moremen, Secretary; moremen@uga.edu
Website: www.glycobiology.org

The 19th Annual Tandem Mass Spectrometry Workshop

November 29–December 2 • Lake Louise, Alberta, Canada
www.csms.inter.ab.ca/louise.htm
E-mail: mnlouise@telusplanet.net; Ph: 403-335-3707

DECEMBER 2006

Second ISN Special Neurochemistry Conference: Neural Glycoproteins and Glycolipids

December 1-5 • Antigua, West Indies
For information contact:www.isnantigua2006.org/

19th World Diabetes Congress

December 3–7 • Cape Town, South Africa
www.idf2006.org/

American Society for Cell Biology 46th Annual Meeting

December 9-13 • San Diego
Ph: 301-347-9300; Email: ascbinfo@ascb.org
Website: www.ascb.org

JANUARY 2007

Sanibel Conference

January 19-22 • Sundial Beach Resort, Sanibel Island, Florida
Imaging Mass Spectrometry
Program Chairs: Richard Caprioli, Ron Heeren, and Markus Stoeckli, For information contact: ASMS
505-989-4517; asms@asms.org; www.asms.org

MARCH 2007

U.S. HUPO 2007

March 4-8 •Seattle
For information contact:www.ushupo.org
Email: USHUPO@USHUPO.org; Ph: 505-9899-4876

Association for Biomolecular Resource Facilities

Mar 31-April 3 •Tampa Convention Center, Florida
For information contact:www.faseb.org/meetings/default.htm
Email: ncopen@faseb.org; Ph: 301-634-7010

APRIL 2007

Second Workshop on Biophysics of Membrane-active Peptides

April 1–4 • Lisbon Science Museum, Portugal
The Lisbon Science Museum includes a 19th century lab and lecture room. Conference call for papers: special theme issue of J Pep Sci. Symposia: Membrane-translocating peptides / Cell penetrating peptides, Membrane-permeabilizing peptides / Antimicrobial peptides, Fusogenic peptides, and Structure and Dynamics in peptide-membrane interaction, Plenary lectures: Jöel Schneide: Bioactive properties of peptide surfaces. Robert Hancock: Antimicrobial peptides. Stuart McLaughlin: Electrostatic interaction of basic peptides with acidic lipids in membranes.
Abstract submission, January 15, 2007, Early registration, January 15, 2007, Faculty of Sciences, University of Lisbon, Miguel Castanho, Ph.D.
www.biophysicsmap.com; E-mail: castanho@fc.ul.pt

American Society for Biochemistry and Molecular Biology Annual Meeting in Conjunction with EB2007

April 28–May 2 • Washington, DC
Contact: ASBMB 2007, 9650 Rockville Pike, Bethesda, MD 20814-3008
Ph: 301-634-7145
Email: meetings@asbmb.org
Website: www.asbmb.org/meetings

2nd International Congress on Prediabetes and the Metabolic Syndrome

April 25–28, 2007 • Barcelona, Spain
www.kenes.com/prediabetes2007;
Email: prediabetes2007@kenes.com

MAY 2007

7th International Symposium of the Protein Society

May 12–16, 2007 • Stockholm-Uppsala, CA Sweden
www.proteinsociety.org/pages/page02b.htm
E-mail: cyablonski@proteinsociety.org
Tel.: 301-634-7277

JUNE 2007

55th ASMS Conference on Mass Spectrometry

June 3-7 •Indianapolis
For information contact: ASMS, 505-989-4517
asms@asms.org; www.asms.org

76th Annual EAS Congress
European Atherosclerosis Society

June 10-13 • Helsinki, Finland
The Congress aims to create a stimulating atmosphere for exchange of the latest scientific and clinical knowledge in the field of atherosclerosis and cardiovascular diseases.
Deadline for submission of abstracts: November 30, 2006
For more information contact:Kenes International, EAS 2007
17, rue du Cendrier; P.O. Box 1726
CH-1211 Geneva 1, Switzerland
Ph: +41 22 908 0488; Fax: +41 22 732 2850
Email: eas2007@kenes.com
Website: www.kenes.com/eas2007

Mitosis Spindle Assembly and Function
A FASEB Summer Research Conference
in Honor of Dr. B. R. Brinkley

June 9 -14 •Hyatt Grand Champions Resort and Spa, Indian Wells, California
Applications from students and post-docs are especially welcome! For additional information contact the organizers:
Dr. Conly L. Rieder, rieder@wadsworth.org or
Dr. Robert E. Palazzo, palazr@rpi.edu.

JULY 2007

XXIst Congress of the International Society on Thrombosis and Haemostasis

July 6–12, 2007 • Geneva, Switzerland
www.isth2007.com

SEPTEMBER 2007

48th International Conference on the Bioscience of Lipids

September 4–8, 2007 • Turku, Finland
www.icbl2007.abo.fi

special clinical issue

Molecular & Cellular Proteomics (*MCP*) is pleased to announce the 4th special issue dedicated to

Biomarker Discovery and Clinical Proteomics

Guest editors: Steven A. Carr and Julio E. Celis

Issue Date: October 2006

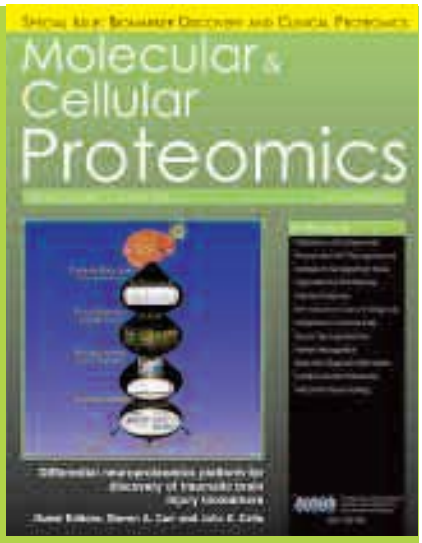
Proteomics is a powerful, cutting-edge discipline that has enormous potential for diagnosis and treatment of human diseases.

This special issue will include articles from presentations at the 2005 Asilomar Conference on "Biomarker Discovery and Clinical Proteomics" organized by Steven Carr and Leigh Anderson, several invited contributions, as well as four research reports selected from direct submissions to the journal. The issue is organized in three sections covering the following topics: 1) biomarkers of disease and conditions, 2) proteomic data analysis, and 3) methodologies.

www.mcponline.org

snapshot of accepted papers

- *Challenges in biomarker discovery.*
- *Protein biomarkers in a mouse model of extremes in trait anxiety.*
- *Novel differential neuroproteomics analysis of traumatic brain injury in rats.*
- *Proteomics in clinical trials and practice: present uses and future promise.*
- *Proteomics of breast cancer: principles and potential clinical applications.*
- *Proteomic based development of biomarkers in cardiovascular disease: Mechanistic, clinical and therapeutic insights.*
- *A platform for experimental pattern recognition.*



If you are in the field of Proteomics or a Clinician interested in biomarkers **you cannot afford to miss this issue!**

ASBMB

American Society For Biochemistry And Molecular Biology