Fostering Communication and Collaboration

The NIH Catalyst

A Publication for NIH Intramural Scientists

National Institutes of Health ■ Office of the Director ■ Volume 18, Issue 4 ■ July – August 2010

Literature Search

The Right One Could Save a Life

By Christopher Wanjek

NIH research librarian Josh Duberman opens his class on information resources for clinical research with a chilling story of how the failure of a literature search to unearth reports of drug toxicity contributed to the tragic death of a young, healthy volunteer.

A standard PubMed search, so often the gold standard for literature reviews, did not uncover British journal articles from 50 years earlier that would have alerted the research team, if not the Institutional Review Board, to the potential for lung failure from the drug hexamethonium.

In a world of instant information, where Google searches deliver the minutiae of ordinary people living ordinary lives, biomedical researchers still can remain oblivious to crucial and sometimes well-known details of a certain drug or procedure.

Neither the NIH nor the most prestigious of the nation's research institutions are immune to such tragedy. The hexamethonium death occurred in 2001 in Baltimore at Johns Hopkins Medicine, the $5 billion health enterprise that includes Johns Hopkins Hospital and the School of Medicine.

The phenomenon of inadequate literature searches may be getting worse, Duberman said, as we become enchanted by a search engine's ability to find 200 million references to "cancer" and thus become overly confident that PubMed's single return for

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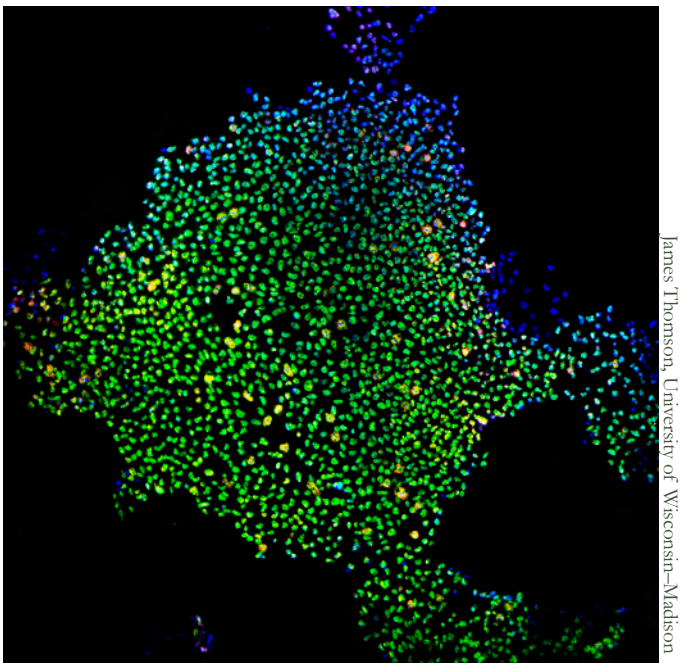
Snapshot of NIH Stem Cell Research

Researchers at NIH are taking a giant step backward . . . in the hope of taking giant leaps forward, reprogramming adult stem cells back to pluripotency for drug screening and personalized therapies. The NIH Catalyst *provides a peek at several new NIH projects in this arena.*

Stem-cell research at the NIH is multiplying and diversifying almost as fast as the potent cells themselves. A presidential order in March 2009 removing barriers to the responsible use of human embryonic stem (hES) cells has led to a resurgence in stem-cell research activity across the country and, of course, in the NIH intramural program. Seventy-five hES cell lines are eligible for federal funding as of June 2010, largely eclipsing the 21 approved in the previous administration.



James Thomson, University of Wisconsin–Madison

Research in induced pluripotent stem (iPS) cells has surged at NIH. Above: Adult skin cells that have been genetically reprogrammed to mimic embryonic stem cells.

In tandem has been furious interest in induced pluripotent stem (iPS) cells, bone-marrow stromal cells, and other types of human and mouse stem cells.

These parallel trajectories reflect neither coincidence nor zeitgeist, said Ron McKay, chief of the NINDS Laboratory of Molecular Biology and head of the NIH Stem Cell Unit since its incarnation in 2004. Rather, all of this new research is a natural outgrowth of breakthroughs in our understanding of cell differentia-

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From the Deputy Director for Intramural Research

Trans–NIH Recruitments

Michael Gottesman

Roland Owens

Last year, the scientific directors decided to pilot a program of tenure-track recruitment that involved trans-NIH searches in all areas of biomedical research and multiple, field–specific search committees. The intent was to attract a diverse group of the most talented early–career scientists to the NIH. The program was named after the late Earl Stadtman, a legendary NHLBI biochemist and mentor to two future Nobel laureates and many members of the National Academy of Sciences. There were more than 800 applications last fall, and over 20 applicants were invited for seminars and interviews.

We are happy to report that the first four Earl Stadtman Investigators have been hired into the tenure track by the NIH Intramural Research Program. They are Haiming Cao, Ph.D., a postdoctoral fellow at the Harvard University School of Public Health (Boston), who has accepted a position in NHLBI; Jill Koshiol, Ph.D., a research fellow at the NCI's Division of Cancer Epidemiology and Genetics, who has accepted a position within that division; Eric Batchelor, Ph.D., a postdoctoral fellow at the Harvard University School of Medicine (Boston), who has accepted a position within NCI's Center for Cancer Research; and Douglas Stewart, M.D., currently in the Physician Scientist Development Program of the NHGRI, who has accepted a position in NCI's Division of Cancer Epidemiology and Genetics. Other potential Earl Stadtman Investigators are in the negotiation phase.

In addition to those designated as Earl Stadtman Investigators, about a half–dozen other applicants, identified by the search committees as highly qualified, likely will receive offers of tenure–track positions. There was also a concurrent trans-NIH search for systems biologists, which has led to at least two tenure–track investigator offers. We thank the approximately 100 NIH scientists who volunteered their time to evaluate the large number of applications. We also thank Michelle Bennett (then–deputy scientific director of NCI's Center for Cancer Research) and Robert Balaban (scientific director of NHLBI) for their leadership in overseeing the Earl Stadtman Investigator Program.

We are already making plans for the next NIH–wide Earl Stadtman tenure–track investigator search. Many of our principal investigators will be getting e-mail invitations to participate in over 20 field–specific search committees. For potential applicants, the official opening of the search will be announced in early August in *Science*, in *Nature*, and on our Web site http://www.training.nih.gov. The closing date for applications likely will be in early October.

To get a better look at more of the top candidates, we are planning to provide a series of symposia from December 6 through December 17 that will feature 15-minute seminars by the top 100 applicants. We look forward to another exciting recruitment season that may result in as many as 20 tenure–track hires.

Please let us know your view on this new approach to recruitment at the NIH. We know you will welcome our new colleagues into the NIH family and continue to encourage new recruitment to the NIH. ■

—Michael Gottesman, DDIR
—Roland Owens, Assistant Director, OIR

23rd Best Place to Work

The NIH has made *The Scientist*'s list of top places to work in academia, clinching the #23 spot, up from #54 last year. Now, normally I discount such lists . . . unless I'm on the list. Then I think it's great.

Our strengths seem to be "Research Resources" and "Pay," which is good news. Research resources have always been our forte; I think our shared resources and shared expertise are unbeatable. And I'm happy to report that postdoc salaries, which have lagged behind some major universities, are on the rise. Our weaknesses, according to the survey, are "Tenure and Promotion" and "Management and Policies." The former perception surprises me. Early–career scientists in the intramural program have many opportunities for advancement—I say more than in universities. Depending on the institute or center, a quarter to half of those hired to the tenure track in the last seven years came immediately from NIH postdoc positions.

As for management issues, well, many policies are handed down by the White House or by the Department of Health and Human Services and we have little room for maneuvering. Nevertheless, we hope to make continued progress on more efficient mandatory training and more efficient hiring and purchasing mechanisms, among other issues.

Research budgets nationwide will take a significant hit in 2011, as American Recovery and Reinvestment Act funding dries up. I won't be surprised if we crack the top 10 on *The Scientist*'s list once researchers better understand the values of the NIH intramural program. The list is at http://www.the-scientist.com/fragments/bptw/2010/academia/bptw-academia-top30.jsp. ■

—Michael Gottesman

Commentary

NIH History and Women Scientists

By Sajel Patel, Office of NIH History

The NIH loves its history. The number of commemorations and tributes to its pioneers and legends, such as the symposium held on May 17, 2010, in honor of Ruth Kirschstein, attests to this fact. Many NIH community members—from those who knew Dr. Kirschstein for the better part of their careers to those, like me, who never had the privilege of knowing her personally—attend these events to gain a sense of history and pride for their institution and a collective narrative on which to build. At this recent tribute, I learned, for example, that Ruth Kirschstein's greatest contributions to NIH included her tireless work in advancing the careers of women and minority scientists as well as research into women's and minority health issues. As one commentator aptly put it, Kirschstein "quite literally changed the face of the NIH."

But here's a surprising fact: Ruth Kirschstein does not appear in the index to Margaret Rossiter's *Women Scientists in America* (Baltimore: Johns Hopkins University Press, 1995), the contemporary canon on the history of American women scientists and one that every graduate student who studies the history of biomedicine must read. Maxine Singer, another famous NIH woman scientist, appears once and only in relation to the National Science Foundation fellowships she received before coming to NIH. She was a molecular biologist who helped decipher the genetic code.

Clearly, the general public has little appreciation or understanding of how NIH has helped to shape the history of women scientists over the past half century.

As a federal agency, NIH was able to play an important role in promoting scientific careers for women. The overall expansion of the federal government during the 1950s provided unprecedented employment opportunities for women scientists. For example, the Department of Health, Education, and Welfare (now the Department of Health and Human Services) employed the most women scientists after the Department of Defense in the decades before affirmative action. Most of these positions were at NIH.

As a federal agency, NIH operated under a distinctly different set of hiring practices than those at universities. For instance, as universities across the country clung to antinepotism codes and effectively eliminated opportunities for married women in academia, the NIH was actively recruiting married couples to its intramural campus during the 1950s and 1960s. The policy drew in talented women like Ruth Kirschstein and many others. The low salaries—an overall deterrent for men in science—associated with federal jobs also created a niche at NIH for women. Finally, several women scientists got their start in the NIH's various divisions such as the Division of Research Grants and the Division of Biological Standards. These divisions—unappealing for male scientists because of their service orientation—capitalized on the scientific expertise of women scientists and served as a launching pad to other jobs at the NIH intramural campus.

As members of the NIH community we can easily point to the pioneers such as Ruth Kirschstein and Maxine Singer who changed the face of NIH, but we know far less about how NIH changed history outside its walls. NIH's Office of History, however, is striving to illuminate NIH's past in order to understand its role in shaping the broader history of American biomedicine and society. ■

Ruth Kirschstein, who died on October 6, 2009, was the first woman director of NIGMS and acting director of NIH twice. She played key roles in the development of a safety test for polio vaccines and in the fight against AIDS. In her half-century career, she mentored countless NIH scientists and administrators, especially women and minorities. At the May 17 symposium, the auditorium in the Natcher Building was named in her honor.

NIH ABBREVIATIONS

CC: NIH Clinical Center

CIT: Center for Information Technology

FAES: Foundation for Advanced Education in the Sciences

FelCom: Fellows Committee

IRP: Intramural Research Program

HHS: U.S. Department of Health and Human Services

NCCAM: National Center for Complementary and Alternative Medicine

NCI: National Cancer Institute

NCMHD: National Center on Minority Health and Health Disparities

NEI: National Eye Institute

NHGRI: National Human Genome Research Institute

NHLBI: National Heart, Lung, and Blood Institute

NIA: National Institute on Aging

NIAAA: National Institute on Alcohol Abuse and Alcoholism

NIAID: National Institute of Allergy and Infectious Diseases

NIAMS: National Institute of Arthritis and Musculoskeletal and Skin Diseases

NIBIB: National Institute of Biomedical Imaging and Bioengineering

NICHD: National Institute of Child Health and Human Development

NIDA: National Institute on Drug Abuse

NIDCD: National Institute on Deafness and Other Communication Disorders

NIDCR: National Institute of Dental and Craniofacial Research

NIDDK: National Institute of Diabetes and Digestive and Kidney Diseases

NIEHS: National Institute of Environmental Health Sciences

NIGMS: National Institute of General Medical Sciences

NIMH: National Institute of Mental Health

NINDS: National Institute of Neurological Disorders and Stroke

NINR: National Institute of Nursing Research

NLM: National Library of Medicine

OD: Office of the Director

OITE: Office of Intramural Training and Education

OIR: Office of Intramural Research

The Training Page

From the Office of Training and Education: Help Build the NIH Alumni Database

By Lori Conlan, OITE

The Office of Intramural Training and Education has a new Web site to share with the scientific community. The redesign reflects the exciting spirit of the OITE, includes sections for each of our trainee populations, and has a new area for NIH investigators and staff.

We are providing enhanced resources and making them easier to find. We hope to expand our outreach to NIH investigators and staff and the extramural community.

The site is also home to our new alumni database. Our fellows often ask for information on where former trainees have gone and wonder about training outcomes. This alumni feature promotes networking, a skill so often emphasized in our career-development programming. Current trainees can search the database to find connections in either a certain field or a particular location. For example, a postbac applying to medical school can find out whether a former trainee is on the faculty there, or a

postdoc can look for alumni with whom to conduct an informational interview to help narrow down a career choice.

The benefits extend to former trainees as well; the database can be used to connect with potential colleagues and former friends from NIH. So, if you spent time at the NIH as a trainee and have now moved on in your career, we hope you will join the—strictly voluntary—database. And if you talk to former fellows, please help us to spread the word so that the alumni database can be a source of networking for the current and future scientific generations at the NIH.

In case you hear that someone would like to train at NIH, the Web site offers a welcoming front door to training opportunities here (click on "Prospective Trainees"). There is a new eligibility wizard (click on "What programs am I eligible for?") that will direct prospective fellows to the appropriate training programs. With more than a dozen training programs at NIH, this new feature helps applicants better navigate to the program that fits their personal career stage.

We hope you find that the new Web site is exciting and informative. Please send us your comments and suggestions for improvement. Visit https://www.training.nih.gov. ■

From an NIH Postbac: How NIH Helped Me Choose a Career

By Ryan Henning, NCI

I was pretty sure I wanted to be a scientist when I graduated from the University of California, Davis, with a bachelor's degree in biochemistry in 2007. I had excelled in my science courses and volunteered in a chemistry research laboratory.

But what kind of scientist did I want to be? Did I want to pursue a Ph.D. or an M.D. degree, or both? I didn't have a clue.

So I applied to NIH for a postbaccalaureate fellowship in NCI's Introduction to Cancer Research Careers (ICRC) program. I figured that conducting full–time research would help me decide on the type of biomedical career to pursue. Making that decision, however, took longer than I anticipated.

During college, the lab where I worked focused on the synthetic organic chemistry of biologically active molecules that would eventually be used to diagnose and treat disease. I loved the chemistry and the projects. But I wanted to see what it was like to work in a pure biology lab and to do translational research. I indicated as much in my ICRC application. When I was accepted, NCI arranged interviews with faculty members who matched my interests. I was excited to choose a lab that had clinical, translational, and basic science projects.

During my first year at NIH I worked on several projects and enjoyed them all. I helped analyze ovarian tumor tissue samples from patients enrolled in clinical trials to determine the effects of the drugs on molecular signaling pathways. I worked on a preclinical study that explored the molecular mechanisms of an approved cancer drug to determine whether it would be effective in a different type of cancer. And I did a basic science project to study the details of a recently discovered tumor-suppressor gene.

But I was still unsure about my career goals. I stayed on for a second year and talked with my section chief about the possibility of continuing for a third.

Soon, however, the novelty of being in a new place began to wear off. I became increasingly frustrated with the growing pile of failed experiments and unexpected results. I felt as though I was in career purgatory and I needed to escape.

I decided to take advantage of many of NIH's other resources to help me gain a broader perspective of biomedical research and get me out of career limbo. I attended lectures, given by world–renowned scientists including Nobel laureates, about their cutting edge research. I turned to NIH scientists and trainees for mentoring and advice. I even helped mentor high school and college students who were working or volunteering at NIH.

I've come to realize that my main passion is basic science. I'm heading to the California Institute of Technology (Pasadena, Calif.) this fall to pursue a Ph.D. in chemistry. By combining a rigorous training in pure chemistry with what I have learned at NIH, I hope to someday become an independent investigator, run my own laboratory, and develop new therapeutic agents.

Being a postbaccalaureate fellow at NIH was a great intermediate career step for me. My experience has helped me realize how I can make the biggest impact in biomedical research. ■

Reducing Paper Use on PaperFree Day

Trevor Blake, NHGRI

At the NHGRI's PaperFree Day table, Gloria Butler is taking an online quiz about paper use and recycling. The NHGRI Green Team had other "green" items on display—a biking helmet to represent biking to work, reusable tote and lunch bags, and a reusable water bottle. The team also distributed recycling bins and other prizes and even gave out ice cream sans bowls and spoons [in cones].

As part of a commitment to protect the environment and use natural resources responsibly, NIH held its first PaperFree Day on Tuesday, May 25, 2010. Green teams throughout the NIH campuses hosted information tables and demonstrations of paperless technology in an effort to raise awareness and reassess paper usage habits.

From an environmental perspective, paper use increases greenhouse gas emissions, energy use, air and water pollution, and deforestation. From a financial perspective, the indirect costs associated with the use of paper (such as costs for toner cartridges, printer electricity, and filing cabinets) can be 10 times that of the direct cost of the paper.

NIHers are determined to do their part in reducing paper use. Here, several intramural employees share their tips and comments:

Although I finally had to print out a paper to review at the end of the day on "paper-free day," I have for years always used the back side of old reports and memos to print everything needed for internal use. It saves an enormous amount of paper.

—Mary Gant, NIEHS

I have gone essentially paperless by using a Modbook tablet Mac in combination with Adobe Acrobat and Papers. All my scientific articles that I used to collect in file cabinets are now stored as PDFs, which I annotate and highlight in silico. Access to PubMed makes this a breeze. Easy to sort and find as well. Saves paper (and ink!).

—Scott Young, NIMH

We are not collecting catalogs as much as we used to. Not only do they become obsolete as quickly as they hit the desk, but also online search engines provide access to many more purchasing options. Some of us reuse our paper and print on the reverse side when we are printing, for example, drafts of a manuscript that we are editing by hand.

—Erika Ginsburg, NCI

NHGRI employees reduced the use of paper by two-thirds for the day and everyone found at least one green practice that they would continue. The most popular practices to continue were printing double sided, reading articles on the computer, and making electronic filing folders to keep articles electronically.

—Trevor Blake, NHGRI

In an effort to reduce paper and storage, the NLM Office of Administrative Management and Analysis Services has submitted a purchase request for a high–speed document scanner, as one our many efforts to increase the electronic distribution of paper documents while decreasing our paper use.

—Felicia A. Derricott, NLM

I head the NIMH Green Committee [and] one intramural employee wrote to me about his concerns related to large amounts of NIH junk mail he continues to get. His view was that it was hypocritical to have a paper-free day while there's no clamping down on this type of waste. With his permission, I sent his e-mail to the NIH Environmental Management System (NEMS) team who sent him a note about behind–the–scenes efforts to reduce needless desk–to–desk issuance of promotional materials and the like. It also gave me an opportunity to invite him to join our committee or the lab practices committee.

—Sophia Glezos Voit, NIMH

Paper-Reduction Check List

[ ] Use, transmit, and store documents electronically instead of in hard–copy format
[ ] Evaluate routine processes and switch to electronic when possible
[ ] Use double–sided printers and copy machines
[ ] Set computer defaults to double-sided printing
[ ] Require double–sided copying for all reports and other documents
[ ] Print only the page range needed rather than the entire document
[ ] Set up a "reuse room" for reusable office supplies such as folders and binders
[ ] Keep used paper near printers to use for drafts, internal memos, and other such documents
[ ] Reuse office scrap paper for scratch pads
[ ] Reduce the default width of margins in Microsoft Word (http://changethemargins.com)
[ ] Shorten documents when possible with smaller fonts and less white space
[ ] Post agendas or information on shared drives instead of handing out copies at meetings
[ ] Use laptops instead of paper to take notes at meetings
[ ] Return unwanted magazines to source with request to discontinue mailings
[ ] Purge mailing lists to eliminate duplication
[ ] Remove names from junk mail lists by contacting Mail Preference Service, Direct Mailing Association, P.O. Box 3861, New York, NY, 10163-3861
[ ] Remove names from catalogs through Catalogchoice.org

Useful Web Sites

NIH Environmental Management System: http://www.nems.nih.gov

Paper-free tips: http://www.nems.nih.gov/home/paperfree.cfm

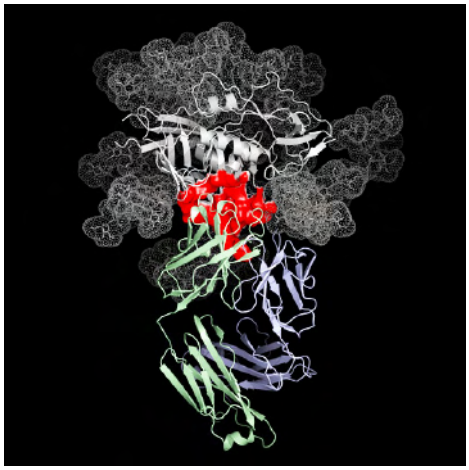
Greenteam contacts: http://nems.nih.gov/teams/team_contact.cfm

Check out this HHS Web site for more Go Green ideas: http://intranet.hhs.gov/building/sustainability.html

LISTSERV

To Sign up for the GreenServe-L LISTSERV, go to https://list.nih.gov. Select "Browse Public Lists," then type "Greenserve-L" in the search window. Follow instructions to subscribe.

Research Briefs



NIAID Vaccine Research Center

This image shows the atomic structure of the antibody VRC01 (lower half of image) binding to HIV. The precise site of VRC01-HIV binding is a subset of the area of viral attachment to the primary immune cells HIV infects.

NIAID: Preventing HIV

NIAID scientists led a team of researchers that has discovered two potent human antibodies—VRC01 and VRC02—that can stop more than 90 percent of HIV strains from infecting human cells in the laboratory, and they have demonstrated how one of these disease–fighting proteins accomplishes this feat. The scientists developed and used a novel molecular device—a modified HIV protein that reacts only with antibodies specific to the site where it binds to cells it infects. The scientists found that VRC01 and VRC02 neutralize more HIV strains with greater overall strength than previously known antibodies to the virus. The researchers also determined the atomic–level structure of VRC01 when it is attaching to HIV and can define how the antibody works and locate where it attaches to the virus.

With this knowledge, the team members have begun to design components of a candidate vaccine that could teach the human immune system to make antibodies similar to VRC01 that might prevent infection by the vast majority of HIV strains worldwide. The method used to find these antibodies could be applied to isolate therapeutic antibodies for other infectious diseases as well. [*Science* DOI:**10**.1126/science.1187659 (2010); *Science* DOI:**10**.1126/science.1192819 (2010)]

NIAMS and NIDCR: Potential New Use for Asthma Drug

NIAMS and NIDCR scientists have discovered that the activation of immune cells called basophils causes kidney damage in a mouse model of lupus nephritis, a severe form of systemic lupus erythematosus (SLE) that affects the kidneys. The new study demonstrates for the first time how basophils activated by self-reactive immunoglobulin E (IgE) antibodies may contribute to kidney damage associated with SLE. To explore the implications for humans, the scientists examined blood samples from 44 people with SLE and found the presence of self-reactive IgEs as well as an increase in activated basophils. Both factors were strongly associated with disease activity and lupus nephritis in the people with SLE. One potential treatment, the asthma medicine omalizumab, is already on the market. It blocks IgE from binding to the surface of basophil cells, which might prevent basophils from promoting kidney inflammation. The NIH team is currently planning a safety study of omalizumab in people with SLE. [*Nature Med* **16**:701–707, 2010]

NIEHS: Certain Proteins Help Manage High Blood Pressure

NIEHS researchers have found that increasing certain proteins in the blood vessels of mice relaxed the vessels, lowering the animals' blood pressure. The researchers created animal models that had a human cytochrome P450 (CYP450 or P450) in the endothelial cells that line blood vessels. The mice with the P450 generated more substances called epoxyeicosatrienoic acids, or EETs, known for their role in protecting the cardiovascular system. EETs relax and dilate the blood vessels and counteract inflammation. The study provides new avenues for research that may lead to new treatments for hypertension. [*FASEB J* DOI:**10**.1096/fj.10-160119 (2010)]

NCI: New Inflammatory Syndrome Identified

NCI scientists have identified a new inflammatory condition called interleukin-6 (IL-6) syndrome caused by Kaposi's sarcoma–associated herpesvirus (KSHV) in some people with HIV or AIDS. This syndrome will be added to three existing types of KSHV–linked illnesses in people with HIV or AIDS: Kaposi's sarcoma, primary effusion lymphoma, and multicentric Castleman's disease (MCD). KSHV, also called human herpesvirus-8, has some genetic sequences that are similar to the human genes that produce IL-6, a cytokine responsible for immune signaling between cells.

Patients with MCD develop high fevers and other inflammatory symptoms that occur when tumor cells overproduce cytokines, in particular, KSHV–associated IL-6. In the new syndrome, patients had inflammatory symptoms similar to those in MCD and high viral IL-6 levels, but they did not have MCD. According to the researchers, this IL-6–related inflammatory syndrome is important to consider in critically ill patients with HIV and KSHV co–infection who develop fevers and other inflammatory symptoms. [*Clin Infect Dis* **51**:350–358, 2010]

NHGRI: How Healthy Young Adults View the Role Genetics Plays

Most healthy young adults place greater emphasis on health habits than on genetic risk factors when considering what causes common diseases, according to NHGRI researchers and the Henry Ford Health System (Detroit). Their study, based on a survey of 1,959 25- to 45-year-olds, is part of the Multiplex Initiative, a large population-based study of how healthy young people use genetic risk–susceptibility tests.

Participants in the study were offered genetic testing for 15 different genes that play roles in eight preventable conditions, including type 2 diabetes, coronary heart disease, high cholesterol, high blood pressure, osteoporosis, lung cancer, colorectal cancer, and malignant melanoma. The participants responded to questions about

behavioral risk factors, family history, beliefs about what might be the causes of the diseases, and health information preferences. The researchers also recorded the respondents' behavioral risk factors, such as physical activity, diet, smoking, and more.

Two-thirds of the participants put greater emphasis on learning about the effects of lifestyle habits, and half placed equal importance on learning about the effects of genes. People with more habits that put their health at risk tended to favor genetics to explain health conditions. They also placed less value on learning about how health habits affect disease risk. One explanation suggested by the authors is that people with unhealthy lifestyle practices might see less value in lifestyle information because they may have tried to change their lifestyles in the past and failed. The study also indicated that family history may be an effective motivator of health behavior change. Those with a family history of disease placed greater value on pursuing genetic information and information about changing health habits than those without. [*Ann Behav Med* DOI:**10**.1007/s12160-010-9197-1 (2010)]

CC, NICHD, and NIDDK: Boys Sure Eat a Lot

Anecdotal reports suggest that adolescent males consume large quantities of food to meet the growth demands of pubertal development. However, there have been limited experimental data to support this impression. CC, NICHD, and NIDDK researchers undertook a study to measure energy intakes of youth at pubertal stages.

Participants were 204 volunteers (50.5 percent male) aged 8 to 17 years. Pubertal development was categorized by physical examination into prepuberty, early to midpuberty, or late puberty. Energy intake was measured as consumption from a 9,835-kcal food array during two lunchtime meals. The observed intake patterns are congruent with known sexual dimorphisms for body composition, peak growth velocity, and pubertal development. Consistent with their higher energy requirements, males can consume significantly larger amounts of food than females, especially during later puberty, the researchers found. [*Am J Clin Nutr* **92:**123–129, 2010]

NIAMS: Behcet's Disease, Genetics, and the Silk Road

An international collaboration that included NIAMS scientists has found susceptibility to Behcet's disease, a painful, inflammatory condition, to be associated with genes involved in the body's immune response. Behcet's disease is found almost exclusively in populations with origins along the Silk Road, an ancient trading route that stretched from Europe to the Far East. The researchers performed the first large genome–wide association study (GWAS) of Behcet's disease in a Turkish population. They looked at the genomes of more than 1,200 Behcet's patients and 1,200 people without the disease in an effort to identify single nucleotide polymorphisms where the two groups differed. After identifying several possible targets, the NIAMS researchers performed a meta-analysis of genetic data from six independent cohorts, which included populations from Turkey, the Middle East, Europe, and Asia.

Further investigation of the interleukin 10 (IL10) gene associated with immune response, showed that people with two copies of the Behcet's disease IL10 gene produced significantly lower levels of IL-10 protein than people with only one or no IL10 disease gene. Since the function of IL-10 is to decrease inflammation, the researchers suggest that low levels of IL-10 protein, in conjunction with external triggers, might be a risk factor for Behcet's disease. Additionally, IL10 has an extensive disease history, with different variants of IL10 having been associated with other autoimmune and autoinflammatory diseases, including ulcerative colitis, type 1 diabetes, systemic lupus erythematosus, and severe juvenile rheumatoid arthritis. These findings suggest that there may be possible therapeutic targets that can be examined in future studies. [*Nature Genetics* (2010) doi:**10**.1038/ng.625]

James Gathany, CDC

A female Anopheles albimanus *mosquito, a vector of malaria (predominantly in Central America), feeding on a human host and becoming engorged with blood.*

NICHD and NIDDK: New Insights into How Malaria Parasites Spread through the Bloodstream

Researchers at NICHD and NIDDK have observed two previously unknown steps in the spread of the malaria parasite through the bloodstream. They focused on how parasites escape infected cells and found they could seal the membrane of an infected blood cell with a surface–acting compound, halting the release of the parasites. The researchers examined red blood cells from volunteers with sickle cell anemia, an inherited disease in which these cells have a curved, or sickle shaped, appearance, and can clog blood vessels and hinder blood flow. Although having two copies of the mutated gene causes sickle cell anemia, having only one copy confers a resistance to malaria. In normal red blood cells, the rupture of cells and subsequent release of the parasites proceeds almost instantaneously and is very difficult to observe. However, in sickled cells, this process occurs at a rate slow enough to be observed. Several minutes before rupturing, the parasite–filled sac inside the cell swells, and the remainder of the cell shrinks. Moreover, seconds before the infected cell bursts, the cell membrane turns porous, like a leaky plastic bag. The researchers discovered that a sealing agent known as poloxamine prevented cells from rupturing and releasing the parasites. They plan to study the effects of poloxamine and similar compounds on the bursting process in hopes of developing a new malaria treatment. [*Curr Biol* **20**:1117–1121, 2010] ■

Lasker Board Meets at Its Founder's Favorite Place: NIH

The Albert and Mary Lasker Foundation held its board meeting for the first time ever on the NIH Bethesda campus in April 2010. This event is surprising considering that one of the Foundation's founders, Mary Lasker, who died in 1994, was instrumental in increasing funding for NIH and influenced the creation of NCI and NHLBI (formerly the National Heart Institute). She received the Presidential Medal of Freedom in 1969 and the Congressional Gold Medal in 1989. In 1984, Congress honored her by designating the Cloisters the Mary Woodard Lasker Center for Health Research and Education. (The 11-acre property was formerly owned by the cloistered Sisters of the Visitation and was purchased in 1983 by NIH.)

In 1942, Mary and her husband Albert, a pioneer of modern advertising, established the Albert and Mary Lasker Foundation. Since 1945 the Albert Lasker Medical Research Awards have been given annually to recognize the contributions of scientists, physicians, and public servants who have made major advances in the understanding, diagnosis, treatment, cure, or prevention of human disease. Lasker awards often presage future recognition by the Nobel committee, so they have become popularly known as "America's Nobels." Seventy-nine Lasker laureates have received the Nobel prize, including 30 in the past two decades.

Thirty Lasker awards have been bestowed on NIH scientists (Robert Gallo received two); Lasker awardee Marshall Nirenberg also won the Nobel prize in 1968.

1948. Dyer, R.E. Albert Lasker Public Service Award. For his scientific accomplishments in microbiological research and for his distinguished service as NIH director during the war and postwar years.

1952. Dean, H. Trendley. Albert Lasker Clinical Medical Research Award. For his leadership in the development of community-wide fluoridation programs.

1959. Freund, Jules. Albert Lasker Basic Medical Research Award. For new findings in the field of immunology and allergy which have strengthened immunization procedures against such diseases as tuberculosis, malaria, rabies and poliomyelitis.

All: Ernie Branson

The Lasker Foundation held its board meeting at NIH, for the first time ever, in April 2010. Board members were welcomed by NIH Director Francis Collins, DDIR Michael Gottesman, and CC Director John Gallin and heard scientific talks by Marston Linehan (NCI) on the genetic basis of kidney cancer and Elaine Ostrander (NHGRI) on her canine genetics work.

Top: Lasker Board members gathered next to the just–unveiled plaque that commemorates Mary Lasker in the NIH building named for her. Lasker Foundation president Maria Freire is in beige suit standing to right of plaque.

Middle: Clinical Center Director John Gallin (in lab coat) gave the visitors a tour of the hospital, including its interstitial space between floors. This unique feature of the CC allows for adjustments and repairs to be made to settings such as air flow and water supply without obstructing patient care.

Bottom: The Lasker Board members stroll a Clinical Center hallway and admire the framed photos of NIH Lasker Award winners.

For more information on the Lasker Foundation, visit: http://www.laskerfoundation.org/awards/formaward.htm.

1962. Smadel, Joseph E. Albert Lasker Clinical Medical Research Award. For his outstanding contributions to the understanding, diagnosis, and treatment of viral and rickettsial diseases, including the demonstration of the efficacy of chloramphenicol as a cure for rickettsial infections such as typhoid fever.

1967. Brodie, Bernard Beryl. Albert Lasker Basic Medical Research Award. For his extraordinary contributions to biomedical pharmacology.

1968. Nirenberg, Marshall Warren. Albert Lasker Basic Medical Research Award. For his contribution toward deciphering the genetic code.

1968. Windle, William. Albert Lasker Basic Medical Research Award. For his basic discoveries in the field of developmental biology.

1972. Carbone, Paul P. Albert Lasker Clinical Medical Research Award. For his outstanding contribution to the concept of combination therapy in the treatment of Hodgkin's disease.

1972. DeVita, Vincent T. Lasker Award in Clinical Research. For his outstanding contribution to the concept of combination therapy in the treatment of Hodgkin's disease.

1972. Frei, Emil III. Albert Lasker Clinical Medical Research Award. For his outstanding contribution in application of the concept of combination chemotherapy for lymphoma and acute adult leukemia.

1972. Freireich, Emil J. Albert Lasker Clinical Medical Research Award. For his outstanding contributions in combination chemotherapy and in supportive care of patients receiving combination chemotherapy for acute leukemia.

1972. Hertz, Roy. Albert Lasker Clinical Medical Research Award. For his outstanding contribution to the successful chemotherapeutic treatment of gestational choriocarinoma.

continued on page 13

SPECIAL PULL–OUT SECTION

Annual Update: Scientific Interest Group Directory

Scientific Interest Groups, a.k.a. NIH Inter-institute Interest Groups, are assemblies of scientists with common research interests. These groups are divided into seven broad, process-oriented parent groups, or faculties, and more than 100 smaller, more focused groups centered on particular research models, subjects or techniques. The latter groups are initiated and run by scientists in the Intramural and Extramural Research Programs at NIH. The interest groups sponsor symposia, poster sessions and lectures; offer mentoring and career guidance for junior scientists; help researchers share the latest techniques and information; act as informal advisors to the Deputy Director of Intramural Research; provide advice for the annual NIH Research Festival; and serve as hosts for the Wednesday Afternoon Lecture Series.

To create a SIG, contact OIR Communications Director Christopher Wanjek. The following list contains active SIGs, to the best of our knowledge. A current list is always posted at http://www.nih.gov/sigs.

MAJOR INTEREST GROUPS

Cell Biology Interest Group
Contact: John Hanover, johnh@bdg8.niddk.nih.gov
http://www.nih.gov/sigs/cellbio
LISTSERV: CELBIO-L@list.nih.gov

Clinical Research Interest Group
Contact: in transition; contact Christopher Wanjek, wanjek@mail.nih.gov
http://www.nih.gov/sigs/clinres

Genetics Interest Group
Contact: in transition; contact Christopher Wanjek, wanjek@mail.nih.gov
http://sigs.nih.gov/genetics
LISTSERV: GIG-L@list.nih.gov

Immunology Interest Group
Meeting time/place: seminars 4:15 p.m. Wed.; Bldg. 10, Lipsett Amphitheater
Contact: Steve Shaw, shaws@mail.nih.gov; Barbara Rehermann, barbarar@intra.niddk.nih.gov
http://sigs.nih.gov/immunology
LISTSERV: IMMUNI-L@list.nih.gov

Molecular Biology/Biochemistry Interest Group
Contact: in transition; contact Christopher Wanjek, wanjek@mail.nih.gov
http://www.nih.gov/sigs/mbbig

Neurobiology Interest Group
Meeting time/place: most Fridays at 4 p.m.; Building 35/BB-1000
Contact: Mark Stopfer, stopferm@mail.nih.gov; Jeff Diamond, diamondj@ninds.nih.gov
http://sigs.nih.gov/neurobiology
LISTSERV: NEUROBIOLOGY@list.nih.gov

Structural Biology Interest Group
Meeting time/place: 3rd Thursdays, 4 p.m.; Building 50, 1st-floor conf. room; plus other events
Contact: Anna Panchenko, panch@ncbi.nlm.nih.gov; Alasdair Steven, stevena@mail.nih.gov
http://sigs.nih.gov/sbig
LISTSERV: STRUCTBIOLIG@list.nih.gov

OTHER INTEREST GROUPS

14-3-3 Protein Interest Group
Contact: David Klein, kleind@mail.nih.gov
http://sigs.nih.gov/1433

Acetyltransferase Interest Group
Contact: David Klein, kleind@mail.nih.gov

Advanced Pharmaceutical Screening Interest Group
Contact: June Lee, junelee@helix.nih.gov
http://sigs.nih.gov/apsig
LISTSERV: APSIG@list.nih.gov

AIDS Interest Group
Meeting time/place: by announcement
Contact: Leonid Margolis, margolis@helix.nih.gov
http://sigs.nih.gov/AIDS
LISTSERV: AIDSINTG-L@list.nih.gov

Animal Well-Being Interest Group
Meeting time/place: quarterly; Bldg. 14G
Contact: Jim Weed, weedj@mail.nih.gov
http://sigs.nih.gov/AWIG

Antibody Interest Group
(new SIG in 2010)
Contact: Mitchell Ho, homi@mail.nih.gov
http://sigs.nih.gov/antibody
LISTSERV: ABIG-L@list.nih.gov

Apoptosis Interest Group
Meeting time/place: 1st Mondays, 4 p.m.; Bldg. 49, Room 1 50/59AB
Contact: Richard Youle, youler@ninds.nih.gov
http://sigs.nih.gov/cell-death
LISTSERV: AIG-L@list.nih.gov

Behavioral & Social Sciences Interest Group
Meeting time/place: lecture series, varies
Contact: Ronald Abeles, abeles@nih.gov
http://sigs.nih.gov/bssrig
LISTSERV: BSSRIG-L@list.nih.gov

Bioethics Interest Group
Meeting time/place: 1st Mondays Sept - June, 3–5 p.m.; usually Natcher Room D
Contact: Miriam Kelty, keltym@mail.nih.gov
http://sigs.nih.gov/bioethics

Bioinstrumentation Interest Group
Contact: Paul Smith, smithpa@ors.od.nih.gov

Biological Visualization Interest Group
Meeting time and place: 1st Wednesday; Bldg. 31, Rm. 2A48,
Contact: Jeremy Swan, swanjere@mail.nih.gov
http://science.nichd.nih.gov/confluence/display/bvig
LISTSERV: BIOVIZ-L@list.nih.gov

Biomedical Computing Interest Group
Meeting time/place: 2nd Thurs. 3–4:30 p.m. (lecture), 4th Thurs. 5:30–7 p.m. (book club)
Contacts: Jim DeLeo, jdeleo@nih.gov; Carl Leonard, cleonard@lired.com
http://www.nih-bcig.org
LISTSERV: BCIG-L@list.nih.gov

Biomedical Research History Interest Group
Contact: Barbara Harkins, harkinsb@mail.nih.gov
http://sigs.nih.gov/brhig
LISTSERV: BRHIG-L@list.nih.gov

Biophysics Interest Group
Contact: Peter Basser, pjbasser@helix.nih.gov
http://sigs.nih.gov/biophysics
LISTSERV: BIOPHYSICSSIG-L@list.nih.gov

Biosciences Business Interest Group
Meeting time/place: varies, usually monthly 12–1 p.m.; Bldg. 37, 4th-floor conf. room
Contact: Val Bliskovsky, bliskovv@mail.nih.gov
http://www3.cancer.gov/bbig
LISTSERV: BIOSCIBUS-L@list.nih.gov

Biospecimens Interest Group
Meeting time/place: regular seminars
Contact: Yaffa Rubinstein, rubinsty@mail.nih.gov
http://sigs.nih.gov/biospecimens
LISTSERV: BIOSPECIMENS@list.nih.gov

Calcium Interest Group
Contacts: Arthur Sherman, asherman@nih.gov; Indu Ambudkar, iambudkar@dir.nidcr.nih.gov
http://sigs.nih.gov/cig
LISTSERV: CALCIUM-L@list.nih.gov

Cell Cycle Interest Group
Meeting time/place: varies; spring symposium
Contacts: Mirit Aladjem, aladjemm@mail.nih.gov; Munira Basrai, basraim@mail.nih.gov; Mary Dasso, mdasso@helix.nih.gov
http://sigs.nih.gov/cellcycle
LISTSERV: CELL_CYCLE_IG@list.nih.gov

Cell & Molecular Neuroscience IG
Contact: Ron McKay, mckayr@ninds.nih.gov

Chemistry Interest Group
Contacts: Dan Appella, appellad@niddk.nih.gov; Carole Bewley, caroleb@intra.niddk.nih.gov; Kenneth Jacobson, kajacobs@helix.nih.gov
http://sigs.nih.gov/chemistry
LISTSERV: CHEMIG@list.nih.gov

Annual Update: Scientific Interest Group Directory (cont.)

Chromatin & Chromosomes IG
Contact: David Clark, clarkda@mail.nih.gov
http://sigs.nih.gov/ccig

Chronobiology Interest Group
Contact: Steven Coon, coons@mail.nih.gov
http://sigs.nih.gov/chronobiology
LISTSERV: CHRONIG-L@list.nih.gov

Clinical Applications of Stem Cells IG
Contact: Manfred Boehm, boehmm@nhlbi.nih.gov

Clinical Pharmacology Interest Group
Meeting time/place: course and meeting on Thurs. Sep-Apr, 6:30 p.m.; Bldg. 10, Lipsett
Contact: Donna L. Shields, 301-435-6618, dshields@mail.cc.nih.gov
http://sigs.nih.gov/cpig
LISTSERV: CLINPHARMACOL-L@list.nih.gov

Cognitive Neuroscience Consortium
Meeting time/place: bimonthly, last Wed., 4:15 p.m.; NSC Bldg., Rm. 2172; plus forums
Contact: Emmeline Edwards, ee48r@nih.gov
http://sigs.nih.gov/cnc
LISTSERV: CNC@list.nih.gov

Critical Illness & Injury Interest Group
Meeting time/place: varies; 3-day conference in December 2009
Contacts: Anthony Suffredini, asuffredini@cc.nih.gov; Scott Somers, somerss@nigms.nih.gov
http://sigs.nih.gov/criticalillness

Cytokine Interest Group
Meeting time/place: committee meets thrice yearly, plus three day-long symposia
Contact: Daniela Verthelyi , daniela.verthelyi@fda.hhs.gov; Calman Prussin, cprussin@niaid.nih.gov
http://sigs.nih.gov/cytokines
LISTSERV: CYTOKN-L@list.nih.gov

Data & Resources Sharing Interest Group
Meeting time/place: 4th Wednesdays, 3–4:30 p.m.; Rockledge 1, Rm. 5147
Contacts: J.P. Kim, jpkim@nih.gov; Marilyn Miller, millerm@nia.nih.gov

DNA Repair Interest Group
Meeting time/place: 3rd Tuesdays, 12:30 p.m. Natcher with 15 videoconf sites
Contacts: Kenneth Kraemer, kraemerk@nih.gov; Vilhelm Bohr, vbohr@nih.gov
http://sigs.nih.gov/DNA-repair
LISTSERV: DNAREPAIR-L@list.nih.gov

Domestic Violence Research Interest Group
Contact: John Umhau, umhau@nih.gov
http://sigs.nih.gov/domesticviolence

Drosophila Interest Group
Meeting time/place: 3rd Tuesdays, 1:15 p.m.; Bldg. 6B, Rm. 4B429
Contact: Jim Kennison, Jim_Kennison@nih.gov
http://sigs.nih.gov/drosophila
LISTSERV: DROSOPHILA-L@list.nih.gov

Drosophila Neurobiology Interest Group
Contact: Ward Odenwald, OdenwaldW@mail.nih.gov
http://sigs.nih.gov/DNIG

Economics Interest Group
Contacts: James A. Schuttinga, schuttij@nih.gov; Xingzhu Liu, Xingzhu_Liu@nih.gov
http://sigs.nih.gov/economics

Emergency Preparedness and Biodefense Interest Group
Contact: Jeffrey Kopp, jbkopp@nih.gov
http://sigs.nih.gov/EPB
LISTSERV: EPBSIG-MEMBERS-L@list.nih.gov

Endocrinology Interest Group
Contact: Karel Pacak, karel@mail.nih.gov
http://sigs.nih.gov/endocrinology

Engineering and Physical Science Interest Group
Contacts: Richard Leapman, leapmanr@mail.nih.gov; Antonina Roll-Mecak, antonina@mail.nih.gov
http://sigs.nih.gov/epsig

Epidemiology & Clinical Trials Interest Group
Contacts: Martina Vogel-Taylor, martinav@nih.gov; Linda Witt, Linda_Witt@nih.gov
http://sigs.nih.gov/epidemiology
LISTSERV: EPIDEM-L@list.nih.gov

Epigenetics Interest Group
Contact: Mukesh Verma, Vermam@mail.nih.gov
http://sigs.nih.gov/epigenetics

Epilepsy Interest Group
Contact: William Theodore, theodorw@ninds.nih.gov
http://epilepsy.sig.nih.gov

Epithelial Transport Biology Interest Group
Contact: Viswanathan Raghuram, raghuramv@mail.nih.gov
http://sigs.nih.gov/ETBIG
LISTSERV: EPITHELIAL-L@list.nih.gov

Flow Cytometry Interest Group
Meeting time/place: two all-day meetings per year; Bldg. 10, Lipsett Ampitheater
Contacts: Bill Telford, telfordw@mail.nih.gov; Jim Simone, simonej@mail.nih.gov
http://sigs.nih.gov/FCIG
LISTSERV: FCIG-L@list.nih.gov

Fluorescence Interest Group
Contacts: Jay Knutson, jaysan@helix.nih.gov; Dan Sackett, sackettd@mail.nih.gov
http://sigs.nih.gov/fluorescence

Free Radical Interest Group
Meeting time/place: 3rd Weds. 4–5 p.m.; Bldg. 10, Rm. 9S235
Contact: Michael Graham Espey, SP@nih.gov or O2club@mail.nih.gov
http://sigs.nih.gov/radical

Glycobiology Interest Group
Meeting time/place: monthly seminars, invited seminars, and Glycosciences Day each May
Contact: Pamela Marino, marinop@nigms.nih.gov
http://sigs.nih.gov/glyco
LISTSERV: GLYCO-L@list.nih.gov

Handheld Users Group
Contact: Ben Hope, 301-594-6473, tallguy@nih.gov
http://sigs.nih.gov/HUG

Head & Neck Cancer Interest Group
Contacts: Alfredo Molinolo, amolinol@mail.nih.gov; Carter Van Waes, vanwaesc@nidcd.nih.gov
http://sigs.nih.gov/head-neck

HTS Assay Development Interest Group
Contacts: Ingrid Li, ili1@mail.nih.gov; James Inglese, jinglese@mail.nih.gov
http://sigs.nih.gov/HADIG
LISTSERV: HADIG@list.nih.gov

Hypoxia Inducible Factor (HIF) Interest Group
Contact: Tawnya McKee, mckee@ncifcrf.gov

Image Processing Interest Group
Contacts: Benes Trus, Benes_Trus@nih.gov
http://image.nih.gov
LISTSERV: IMAGE@list.nih.gov

Infectious Diseases Interest Group
(new SIG in 2010)
Contact: Matthias Machner, machnerm@mail.nih.gov

Infectious Disease Imaging Interest Group
Contact: Mike Bray, mbray@niaid.nih.gov
http://sigs.nih.gov/IDIIG
LISTSERV: IDIIGLIST-L@list.nih.gov

Integrative Neural-Immune Interest Group
Contact: Socorro Vigil-Scott, vigilscs@mail.nih.gov
http://neuralimmune.nih.gov

Integrative Neuroscience Interest Group
Contacts: Bruce Cumming, bgc@lsr.nei.nih.gov; Mitchell Smith, mitch@lsr.nei.nih.gov
LISTSERV: INT-NEUROSCI-L@list.nih.gov

In Vivo NMR Interest Group
Contact: Jeff Duyn, 301-594-7305, jhd@helix.nih.gov
http://sigs.nih.gov/invivonmr
LISTSERV: INVIVONMR-L@list.nih.gov

Lab Managers Interest Group
Meeting time/place: 2nd Thursdays, noon; Building 40, Rm. 1203
Contact: Dawn Walker, walkerd@mail.nih.gov
http://sigs.nih.gov/lab_managers
LISTSERV: LOCL-L@list.nih.gov

Lambda Lunch (Bacterial and Phage Genetics)
Meeting time/place: Thursdays, 11 a.m.; Bldg. 37, Rm. 6107/6041
Contacts: Susan Gottesman, susang@helix.nih.gov; Robert Weisberg, rweisberg@nih.gov
http://www.nih.gov/sigs/lambda
LISTSERV: LAMBDA_LUNCH-L@list.nih.gov

Light Microscopy Interest Group
Contacts: Christian Combs, combsc@nhlbi.nih.gov; James McNally, mcnallyj@mail.nih.gov
http://sigs.nih.gov/LightMicroscopy
LISTSERV: LIGHT_MICRO_INTER-ESTL@list.nih.gov

Liver Biology Interest Group
Contact: Bin Gao, 301-443-3998, bgao@mail.nih.gov
http://sigs.nih.gov/LBIG

MRI and Spectroscopy Interest Group
Contact: Doug Morris, MorrisD@ninds.nih.gov
http://sigs.nih.gov/mris

Mass Spectrometry Interest Group
Meeting time/place: 1st Thursdays, 10:30 a.m.; Bldg. 10, Rm. 7S235
Contact: Peter Backlund, backlunp@mail.nih.gov
http://sigs.nih.gov/msig
LISTSERV: MASS_SPEC_IG@list.nih.gov

Membrane Protein Interest Group
Meeting time/place: Tuesdays as scheduled, 1 p.m.; Bldg. 35, Rm. BB1000
Contact: Reinhard Grisshammer, 301-594-9223, rkgriss@helix.nih.gov
http://sigs.nih.gov/mpig
LISTSERV: MPIG-L@list.nih.gov

Metabolomics Scientific Interest Group
Contact: Padma Maruvada, maruvadp@mail.nih.gov
http://sigs.nih.gov/metabolomics
LISTSERV: METABOLOMICS@list.nih.gov

Microarray Users Group
Meeting time/place: usually 1st Wednesdays 10–11 a.m.; Journal Club meets 3rd Thursdays at 4 p.m.; place varies
Contact: Katherine Peterson, petersonk@nei.nih.gov
http://sigs.nih.gov/musig
LISTSERV: Microarray-User-L@list.nih.gov

Microbiome Working Group
(new subgroup of the Mucosal Immunology and Microbiome Interest Group)
Contact: Howard Young, younghow@mail.nih.gov
LISTSERV: MICROBIOME@list.nih.gov

Mitochondria Interest Group
Meeting time/place: frequent but varies
Contact: Steve Zullo, zullost@csr.nih.gov
http://sigs.nih.gov/mito
LISTSERV: MITOCHONDRIA-L@list.nih.gov

Molecular & Functional Biophotonics Interest Group
Contacts: Amir Gandjbakhche, amir@helix.nih.gov; Jana Kainerstorfer, kainersj@mail.nih.gov
http://sigs.nih.gov/BioPhotonics
LISTSERV: OPTICALIMAGING@list.nih.gov

Molecular Modeling Interest Group
Contact: Peter Steinbach, steinbac@helix.nih.gov
http://mmignet.nih.gov

Motility Interest Group
Contact: Jim Sellers, 301-496-6887, sellersj@nhlbi.nih.gov
http://sigs.nih.gov/motility
LISTSERV: MOTILITY-L@list.nih.gov

Mouse Club
Meeting time/place: 1st Tuesdays, 4 p.m.; Bldg. 6A, Rm. 4A05
Contact: Heiner Westphal, 301-402-0545, hw@mail.nih.gov

Mucosal Immunology and Microbiome Interest Group (formerly Mucosal Immunology Interest Group)
Meeting time/place: last Fridays, noon; Bldg. 40, VRC Rm. 1201
Contact: Brian Kelsall, bkelsall@niaid.nih.gov
http://sigs.nih.gov/MIMIG
LISTSERV: MIMIG@list.nih.gov

Muscle Interest Group
Meeting time/place: varies; usually Bldg. 40, Rm. 1203 or 1205
Contact: Andres Buonanno, buonanno@mail.nih.gov
http://sigs.nih.gov/muscle
LISTSERV: Muscle-IGL@list.nih.gov

Nanomedicine-Nanotech IG
Contacts: Kuan Wang, wangk@mail.nih.gov; Jeffrey Forbes, forbesj@mail.nih.gov
http://sigs.nih.gov/nano

Neural Cell Function Interest Group
Meeting time/place: usually 3rd Fridays, 2:30-5 p.m.; Bldg. 49, Rm. 1A-51
Contact: Lee Eiden, eidenl@mail.nih.gov
http://sigs.nih.gov/NCFig

Neurodevelopmental Disorders IG
Meeting time/place: 2nd Thursdays, 12:30–1:30 p.m.; Bldg. 10, Rm. 2-3330
Contact: Teresa Huggins, TeresaHuggins@mail.nih.gov
http://sigs.nih.gov/ndd
LISTSERV: NEURO_DEV_DIS-L@list.nih.gov

Neuroinformatics Scientific Interest Group
Contact: Kathryn Bognovitz, kbognovi@mail.nih.gov
http://sigs.nih.gov/neuroinformatics
LISTSERV: NEUROINFOIG-L@list.nih.gov

Neuromuscular Diseases Interest Group
(new SIG in 2010)
Contact: Bryan Traynor, Bryan.Traynor@nih.gov

Nonhuman Primate Neurobiology Research Interest Group
Meeting time/place: 12:30–2 p.m.; day and place varies
Contact: Matthew Novak, novakm@mail.nih.gov
http://sigs.nih.gov/monkey

Nurse Practitioner Interest Group
Contact: Stacey Solin, solins@cc.nih.gov
http://sigs.nih.gov/np

Pain Interest Group
Meeting time/place: 2nd Tuesdays, 3:30 p.m.; Bldg. 49, Rm. 1A51
Contact: Michael Iadarola, miadarola@dir.nidcr.nih.gov
http://sigs.nih.gov/pain

Patent Law & Technology Transfer Interest Group
Contacts: Cameron Good, goodc@mail.nih.gov; Thomas Paul, paulth@mail.nih.gov
http://sigs.nih.gov/patent
LISTSERV: PATENT_SIG_L

Pediatric Clinical Research & Outcomes Interest Group
Contact: Steven Hirschfeld, hirschfs@mail.nih.gov
http://sigs.nih.gov/pedoutcomes
LISTSERV: PEDIATRICCLINRES@list.nih.gov

Pediatric Imaging Scientific Interest Group
(new SIG in 2010)
Contact: Carlo Pierpaoli, cp1a@nih.gov
http://sigs.nih.gov/pedimaging

Pediatric Neuroimaging Interest Group
Contact: Lisa Freud, freundl@mail.nih.gov
http://sigs.nih.gov/pedneuroimaging

PET Interest Group
Meeting time/place: Fridays as scheduled, 2 p.m.; PET Dept. (Bldg. 10, Rm. 1-5674)
Contact: Peter Herscovitch, herscovitch@nih.gov
http://sigs.nih.gov/PET
LISTSERV: PETINT-L@list.nih.gov

Phage-Tech Interest Group
Contact: Rotem Edgar, edgarr@mail.nih.gov
http://sigs.nih.gov/Phage

Annual Update: Scientific Interest Group Directory (cont.)

Pharmacogenetics Interest Group
Meeting time/place: last Thursdays, 3:30–5:00 p.m.; Rockledge 2
Contact: Pothur Srinivas, srinivap@mail.nih.gov
http://sigs.nih.gov/PhIG
LISTSERV: PHIG-L

Pigment Cell Research Interest Group
Meeting time/place: 3rd Thurs, 12:30-2:00 p.m.; Bldg. 49, Rm. 1A51; yearly daylong meeting
Contacts: Tom Hornyak, hornyakt@mail.nih.gov; Julio C. Valencia, valencij@mail.nih.gov
http://sigs.nih.gov/pigment
LISTSERV: PIGINTGRP@list.nih.gov

Polyunsaturated Lipid Function IG
Contact: John Paul SanGiovanni, jpsangio@nei.nih.gov
http://sigs.nih.gov/pufa
LISTSERV: PLFSIGL@list.nih.gov

Probiotic and Prebiotic Working Group
Meeting time: 3rd Wednesdays
Contact: Crystal McDade-Ngutter, mcdadengutterc@mail.nih.gov
http://sigs.nih.gov/ppwg
LISTSERV: NIH-PPWG@list.nih.gov

Prostate Cancer Interest Group
Contact: Marston Linehan, linehanm@mail.nih.gov

Protein Trafficking Interest Group
Meeting time/place: 2nd Tuesdays, 3:30–5:00 p.m.; Bldg. 50, Rm. 2328
Contact: Manu Hegde, hegder@mail.nih.gov
LISTSERV: ProtTRAF-L@list.nih.gov

Proteomics Interest Group
Meeting time/place: monthly seminar series in Bldg. 50; usually first Fridays
Contact: Sanford Markey, markeys@mail.nih.gov
http://proteome.nih.gov/
LISTSERV: PROTIG@list.nih.gov

Retinal Diseases Interest Group
Meeting time/place: usually 2nd Tues. or Wed.; Bldg. 10, Rm. 10N202 (Cogan room)
Contact: Tiziana Cogliati, cogliatitp@nei.nih.gov
http://rdig.nei.nih.gov/
LISTSERV: RDIG-L@list.nih.gov

NIH RNA Club
Meeting time/place: 1st Tuesdays, 4 p.m.; Bldg. 31, Rm. 2A48
Contact: Rich Maraia, maraiar@mail.nih.gov
http://sigs.nih.gov/NIH_RNA_Club
LISTSERV: RNACLUB-L@list.nih.gov

Staff Scientists/Staff Clinicians Organization
Meeting time/place: 2nd Thursdays, noon; Bldg. 40, Rm. 1203
Contacts: Rodolfo Ghirlando, rodolfo.ghirlando@nih.gov; Michael Espey, sp@nih.gov
http://sigs.nih.gov/NIH_SSSC
LISTSERV: STAFFSCIENTIST-L@list.nih.gov

Stem Cell Interest Group
Meeting time/place: monthly seminars
Contacts: Nadya Lumelsky, nadyal@nidcr.nih.gov; Manfred Boehm, boehmm@nhlbi.nih.gov
http://sigs.nih.gov/SCIG
LISTSERV: STEMCELL_IG-L@list.nih.gov

Stroke Branch Interest Group
Meeting time/place: varies at Suburban Hospital and Washington Hospital
Contacts: Jose Merino, merinoj@ninds.nih.gov; John Kylan Lynch, LynchJ@ninds.nih.gov

Synaptic and Developmental Plasticity IG
Meeting time/place: bimonthly on a Tuesday, 11 a.m.; Bldg. 35, Rm. BB1000
Contact: Chris McBain, mcbainc@mail.nih.gov
http://sigs.nih.gov/sdpig

Systems Biology Interest Group
Meeting time/place: 1st Thursdays, 2 p.m., monthly seminars; Bldg. 10, Rm. 7S235
Contacts: Eric Billings, billinge@nhlbi.nih.gov; David Balshaw, balshaw@niehs.nih.gov
http://sysbiosig.nih.gov
LISTSERV: SYSBIOSIG-L@list.nih.gov

TGF-beta Special Interest Group
Contact: Sushil Rane, ranes@niddk.nih.gov
http://sigs.nih.gov/TGF-beta
LISTSERV: TGF-BETA-L@list.nih.gov

Tissue Microdissection Interest Group
Contact: Jaime Rodriguez-Canales, rodrigja@mail.nih.gov
http://home.ccr.cancer.gov/LOP/Research/lcm
LISTSERV: LCM@list.nih.gov

Tobacco & Nicotine Research Interest Group
Meeting time/place: 4th Wednesday bimonthly, 2–3:30 p.m.; place varies yearly
Contact: Allison Hoffman, HoffmanAL@mail.nih.gov
http://sigs.nih.gov/tobacco
LISTSERV: NIH-TOBACCO@list.nih.gov

Transcription Factor Interest Group
Meeting time/place: most 1st Thursdays, 2 p.m.; Bldg. 50, 1st-floor conf. room
Contact: Stoney Simons, steroids@helix.nih.gov
http://sigs.nih.gov/tfactors
LISTSERV: TFACTORS@list.nih.gov

Trans-Institute Angiogenesis Research Program
Contacts: William Figg, wdfigg@helix.nih.gov; Steven Libutti, slibutti@nih.gov
http://www.tarp.nih.gov

Translational Research Interest Group
Meeting time/place: seminar series
Contact: Min Song, songm@mail.nih.gov
http://sigs.nih.gov/trig
LISTSERV: TRIG-L@list.nih.gov

Viral Hepatitis Interest Group
Meeting time/place: One Monday monthly, 2–3:30 p.m., Bldg. 10, Rm. 9S235 (Bunim)
Contact: Barbara Rehermann, Rehermann@nih.gov
http://sigs.nih.gov/vhig
LISTSERV: VHIG-L@list.nih.gov

Virology Interest Group
Meeting time/place: 1st Thursdays, noon; Bldg. 4, Rm. 433; November minisymposium
Contacts: Kuan-Teh Jeang, kjeang@mail.nih.gov; Carolyn Wilson, carolyn.wilson@fda.hhs.gov
http://sigs.nih.gov/vig
LISTSERV: NIHVIG-L@list.nih.gov

Washington Area NMR Interest Group
Meeting time/place: mini-symposia thrice yearly
Contact: Daron Freedberg, daron_freedberg@nih.gov
http://sigs.nih.gov/wang

Washington Area Yeast Club
Meeting time/place: 2nd Wednesdays, 4:30 p.m.; Bldg. 6A, Rm. 4A05
Contact: Henry Levin, henry_levin@nih.gov
http://sigs.nih.gov/yeast
E-mail: yeast@mail.nih.gov

Wnt Working Group
(new SIG)
Contact: Jeffrey Rubin, rubinj@mail.nih.gov; Terry Yamaguchi, yamagute@mail.nih.gov
http://sigs.nih.gov/wnt

Women's Health Special Interest Group
Meeting time/place: Fridays as scheduled, 11:30 a.m.–12:30 p.m.; Bldg. 1, Wilson Hall
Contacts: Vicki Malick, malickv@mail.nih.gov; Rosemarie Filart, filartr@mail.nih.gov
http://sigs.nih.gov/whsig

X-ray Diffraction Interest Group
Meeting time/place: varies, see http://mcl1.ncifcrf.gov/nihxray
Contact: Fred Dyda, fred.dyda@nih.gov
http://sigs.nih.gov/xray
LISTSERV: NIHXRAY-L@list.nih.gov

Zebrafish-Frog Interest Group
Meeting time/place: last Monday each month, noon; Bldg. 50, 5th fl. conf. room
Contact: Tom Sargent, tsargent@nih.gov
http://science.nichd.nih.gov/confluence/display/zfig

LASKER

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1972. Holland, James. Albert Lasker Clinical Medical Research Award. For his outstanding contribution to the concept and application of combination therapy in the treatment of acute leukemia in children.

1972. Li, Min Chiu. Albert Lasker Clinical Medical Research Award. For his outstanding contribution to the successful chemotherapeutic treatment of gestational choriocarcinoma.

1972. Van Scott, Eugene J. Albert Lasker Clinical Medical Research Award. For his outstanding contribution to the concept of topical chemotherapy in the treatment of mycosis fungoides.

1972. Ziegler, John L. Albert Lasker Clinical Medical Research Award. For his outstanding contribution in increasing the cure rate of Burkitt's tumor by chemotherapy.

1972. Zubrod, C. Gordon. Albert Lasker Clinical Medical Research Special Award. For his leadership in expanding the frontiers of cancer chemotherapy.

1980. Levy, Robert I. Albert Lasker Special Public Health Award. For the Hypertension Detection and Follow-Up Program, standing alone among clinical studies in its profound potential benefits to millions.

1981. Sokoloff, Louis. Albert Lasker Clinical Medical Research Award. For developing a pioneering method of mapping and measuring brain function, both as a whole and in localized areas—a monumental breakthrough in the understanding and diagnosis of brain diseases.

1982. Brady, Roscoe O. Albert Lasker Clinical Medical Research Award. For his pioneering contribution to the understanding of hereditary diseases, the development of effective genetic counseling procedures, and initiation of possible treatment by replacement of missing enzymes.

1982. Gallo, Robert C. Albert Lasker Basic Medical Research Award. For his pioneering studies that led to the discovery of the first human RNA tumor virus and its association with certain leukemias and lymphomas.

1982. Neufeld, Elizabeth F. Albert Lasker Clinical Medical Research Award. For clarifying the molecular basis and diagnosis of certain hereditary lysosomal storage disorders that may cause growth abnormalities, mental retardation, blindness, deafness, and death.

1984. Potter, Michael. Albert Lasker Basic Medical Research Award. For his fundamental research into the genetics of immunoglobulin molecules, paving the way for the development of hybridomas.

1986. Gallo, Robert C. Albert Lasker Clinical Medical Research Award. For determining that the retrovirus now known as HIV-1 is the cause of Acquired Immune Deficiency Syndrome (AIDS).

1987. Leder, Philip. Albert Lasker Basic Medical Research Award. For his elegant genetic studies, particularly in carcinogenesis, and for developing transgenic laboratory animals for the study of cancer and other diseases.

1996. Robbins, John B. Albert Lasker Clinical Medical Research Award. For developing, with Rachel Schneerson, a polysaccharide-protein conjugate vaccine against *Haemophilus influenzae* type B.

1996. Schneerson, Rachel. Albert Lasker Clinical Medical Research Award. For developing, with John Robbins, a polysaccharide-protein conjugate vaccine against *Haemophilus influenzae* type B.

1999. Kety, Seymour Solomon. Albert Lasker Special Medical Research Achievement Award. For his research in neuroscience, especially for finding a way to measure cerebral blood flow that led to modern-day brain–imaging techniques.

2000. Alter, Harvey J. Albert Lasker Clinical Medical Research Award. For his ongoing studies to uncover the causes and reduce the risks of transfusion-associated hepatitis.

2007. Fauci, Anthony. Mary Woodard Lasker Award for Public Service. For his role as the principal architect of two major U.S. governmental programs, one aimed at AIDS and the other at biodefense. ■

Cars and Pedestrians: Can't We All Just Get Along?

There was a serious accident in the afternoon of June 29 on the corner of South Drive and Center Drive, near Building 50, in which a car struck a pedestrian. I do not know the details of the incident, but one fact is clear: We have a shared responsibility as pedestrians, bikers, and drivers.

The irony here is that many of us are pedestrians in that we are walking to our own cars. Then we become drivers and expect a certain level of responsibility from the pedestrians.

When walking, make no assumptions that an approaching driver sees you. Avoid the temptation to cross the street outside of the crosswalks, because drivers might not be expecting you.

Pay attention to your surroundings. You might be able to walk and chew gum, but you cannot type on your smartphone and simultaneously remain fully aware of the cars and bikes zooming by. Trust me. I've checked with NINDS and NIMH on this.

Also, please be kind to the cars. Consider pausing for three seconds at a stop sign to allow a driver to pass through, instead of exercising your inherent right of way.

When driving, make no assumptions that the walkers will heed any of the advice in the preceding paragraphs. Avoid the temptation to adjust your radio or to make a phone call as you navigate the traffic of the parking lots and crosswalks.

Remember that the Bethesda campus is filled with wandering scientists wedded to their BlackBerrys, iPhones, and iPods—many of whom would be lost in thought even without this personal technology.

Also, please be patient: Your day won't be delayed for more than a few seconds as you drive more slowly on campus and stop for pedestrians.

We've tried so hard to reduce injuries in the lab that it pains me to hear of these avoidable accidents. Remember, too, that for all those involved in an accident—drivers and pedestrians—their lives can be changed forever.

—Michael Gottesman, DDIR

Stem Cells

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Michael Spencer

Many NIH scientists conduct stem–cell research. From top: Ron McKay, NINDS, head of the NIH Stem Cell Unit; Pamela Robey, NIDCR; Harry Malech, NIAID.

tion during the last few years. And, McKay added, working on all fronts "is critically important" if we are to be successful in translating stem-cell research into cures.

"This field will energize many areas of medicine," he said. "We already have proof of concept that stem-cell biology is the basis for major advances in human genetics and regenerative medicine. A central issue . . . is how to initiate a world-class program in this area—where to focus, whom to encourage."

That sentiment, shared by many in the NIH intramural program, led to an iPS cell workshop on January 15, 2010, to which the NIH invited Shinya Yamanaka of Kyoto University (Japan), a co-discoverer of a method to make adult stem cells pluripotent, and nine other speakers. The goal was to ask these experts how the NIH intramural program could contribute to and complement the iPS cell field.

By March, NIH Director Francis Collins, who attended most of the workshop and led the afternoon brainstorming session, approved support from the NIH Common Fund for the creation of an intramural-based NIH iPS Cell Center. Now the center is recruiting a director and is sorting out which iPS cell projects to fund. The latter is no easy task, given the intense level of interest across the NIH, said John O'Shea, the NIAMS scientific director who is coordinating the center's activities in the interim.

The intramural program has already made major contributions in the field of hES cells, largely through the efforts of the NIH Stem Cell Unit, which cultured 17 of the then–21 federally approved human embryonic stem-cell lines, with great success in characterizing them and establishing growth protocols. Similarly, the NIH Bone Marrow Stromal Cell Transplantation Center is ramping up to supply clinical–grade human bone-marrow stromal cells to investigators for use in clinical trials for the treatment of a variety of diseases and disorders.

The scope of the NIH iPS Cell Center is not yet defined, but the potential is exciting. McKay's group is studying neuronal differentiation of pluripotent cells, and the Stem Cell Unit may play a role in developing and validating human iPS cell lines carrying allelic variant of genes that predispose to human disease. These cells may prove invaluable in elucidating the pathophysiology of disease at the cellular and molecular level and may be useful in screening small-molecule libraries for compounds that delay or prevent the onset of disease.

The Stem Cell Unit will continue its focus on training intramural scientists in growing stem cells. Pamela Robey, chief of NIDCR's Craniofacial and Skeletal Diseases Branch, who established the bone-marrow stromal cell center with Harvey Klein of the NIH Clinical Center, took the hES "course" out of her desire to complement her expertise in stromal cells. The course has led to Robey's foray into iPS cells (see next page).

"We are already a major player in the field of research using pluripotent cells," said NIDCD Director James Battey, vice chair of the NIH Stem Cell Task Force.

The *Catalyst* editors have compiled examples of predominantly iPS cell projects to highlight the diversity of activity in this field. You can find a more complete sampling at http://intramural.nih.gov, particularly in the fall when the FY2010 reports are posted.

* * * * * *

Prometheus Set Free: hES and iPS Cells for the Liver

Snorri S. Thorgeirsson, Dongho Choi, Seung Lee, Mitsuteru Kitade, Valentina Factor, and others in NCI's Laboratory of Experimental Carcinogenesis

In 2006 we first reported on our system for differentiation, expansion, and isolation of hepatic progenitor cells from mouse embryonic stem cells, as well as the subsequent evaluation of their capacity to repopulate a diseased liver upon transplantation. These hepatic progenitor cells developed into mature hepatocytes without evidence of cell fusion and helped to rebuild normal parenchyma with reconstitution of liver-specific zonal gradients of hepatic functions.

The stem-cell-derived hepatocytes were responsive to normal growth regulation and proliferated at the same rate as the host hepatocytes after an additional growth stimulus from CCl4–induced liver injury. The transplanted cells also differentiated into biliary epithelial cells. This work has demonstrated that a highly enriched population of committed hepatocyte precursors can be generated from mouse embryonic stem cells in vitro for effective cell–replacement therapy.

We also have developed a protocol to coax hES cells toward early stages of hepatocytic differentiation. Up to 80 percent of the cells expressed high levels of albumin and exhibited several other known hepatic functions, including accumulation of glycogen. We established

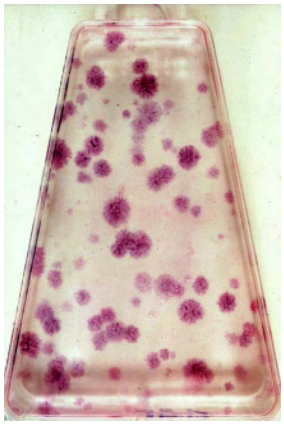
a protocol for generating iPS cells from human fibroblasts by transduction with lentiviruses. These iPS cells recapitulate the hepatocytic differentiation and morphological changes seen with the hES cells.

Our research focuses on detailed biochemical and genomics characterization of the in vitro differentiation of hES and iPS cells into hepatocytes, including in vivo transplantation of the cells into day-old mice to test their ability to give rise to differentiated hepatocytes, and development of a protocol for differentiation of embryonic stem cells and iPS cells into cholangiocytes, the epithelial cells of the bile duct, based on three-dimensional culture conditions that we developed for cholangiocytic differentiations of adult liver stem cells.

Building New Bone and Cartilage

Pamela Robey, Sergei Kuznetsov, Natasha Cherman, Marianna Sabatino, Jiaqiang Ren, and others in the NIDCR Craniofacial and Skeletal Diseases Branch and the NIH Clinical Center

Adult stem cells have a limited capacity to generate the large number of cells needed for extensive bone and cartilage regeneration; thus, deriving osteogenic or chondrogenic cells from pluripotent stem cells would be a welcome alternative.



Pam Robey's group is devising techniques to develop cartilage from human bone-marrow stromal cells, which are grown in colonies like these shown here.

For this reason, we have been working to identify conditions that favor osteogenic differentiation of the HSF-6 hES cell line. And we've had some initial success. Our transplants of cultured HSF-6 cells in immunocompromised mice generated bone of human origin, with broad areas of multiple intertwining trabeculae, microscopic beams of supporting mineralized extracellular matrix. This result represents the most extensive in vivo bone formation, by far, from hES–derived cells. In future studies, we aim to apply these culture conditions to human iPS cells and to further improve upon them to develop more consistent bone formation.

We also are devising techniques to develop cartilage from human bone-marrow stromal cells (BMSC), also known as mesenchymal stem cells. In pellet cultures with chondrogenic factors, these BMSCs are able to form cartilage, but the resulting tissue undergoes hypertrophy.

Our recent studies suggest that expansion of human BMSCs in human platelet lysate may enhance expression of chondrogenic markers. Researchers at the University of Manchester, England, have reported that growth of BMSCs in hypoxic conditions further enhances their chondrogenic ability. We plan to apply this knowledge of inducing chondrogenesis in BMSCs to human iPS cells. The ability to generate dedicated bone- and cartilage-forming cells from iPS cells will mark a major advance in the use of pluripotent stem cells for tissue regeneration in individuals with skeletal defects.

Therapeutic Hematopoietic Cells

Harry Malech, Colin Sweeney, Uimook Choi, and others in the NIAID Laboratory of Host Defenses and at Johns Hopkins (Baltimore)

Despite the promise of hES cells for producing therapeutically relevant blood cells, the field has had limited success in producing functional mature hematopoietic progeny. Japanese researchers have created functional mature neutrophils from hES cells following differentiation in vitro, a major advance. But major hurdles persist, such as the relatively low increase in the number of neutrophils obtained.

More of the NIH scientists who conduct stem–cell research. From top: Heiner Westphal, NICHD; Manfred Boehm, NHLBI; and Snorri Thorgeirsson, NCI.

This Japanese work provided us with a roadmap to determine whether human iPS cells might produce functional hematopoietic progeny using a similar protocol. We initiated an iPS cell program in the genetic immunotherapy section in NIAID's Laboratory of Host Defenses in 2009 and partnered with Linzhao Cheng at the Johns Hopkins Stem Cell Program in the Insti-

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Stem Cells

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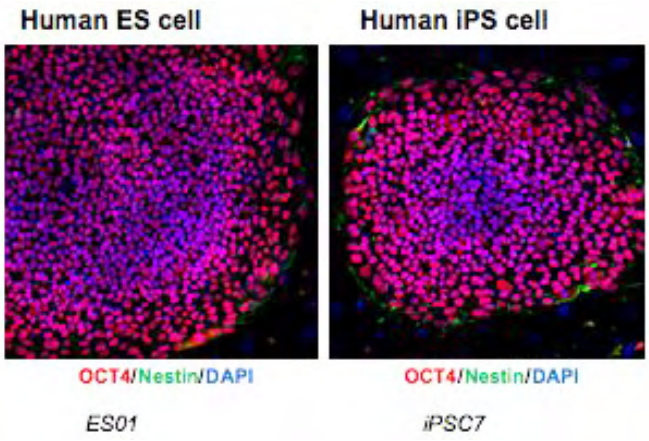
tute for Cell Engineering. Together we established a patient iPS cell line for X–linked chronic granulomatous disease (CGD), a hereditary disease in which certain cells of the immune system have difficulty forming reactive oxygen compounds.

We since have differentiated iPS cells to become mature neutrophils. The neutrophils derived from healthy volunteer iPS cells can be stimulated to produce superoxide and hydrogen peroxide, which is important for the antimicrobial function of blood neutrophils. Neutrophils differentiated from the X-CGD iPS cells, on the other hand, fail to produce superoxide, which is expected because that is the result of the genetic defect causing CGD.

We more recently have derived lentivirus–vector gp91phox-gene-corrected X-CGD iPS cells and will try to differentiate these to see whether we have corrected the neutrophils that differentiate from these gene–corrected X-CGD iPS cells. This new iPS cell work fits into our long–established clinical program on CGD in which we have ongoing clinical trials of either allogeneic bone–marrow transplant or gene–therapy treatments for CGD. We hope to publish more on this work later this year.



These images show undifferentiated human pluripotent cells. The pluripotency transcription factor Oct4 is expressed at high levels and a few cells around the periphery of the colony express nestin, an intermediate filament specifically found in neural stem cells. The iPS cell line shown here was derived from a Parkinson's patient. The close similarity between ES and iPS cells opens the prospect of devising functional assays to determine disease mechanisms and of designing targeted interventions.

Pluripotent Reprogramming Efficiency

Heiner Westphal and members of the Section on Mammalian Molecular Genetics in the NICHD Program in Genomics of Development

We study transcriptional events that control differentiation of embryonic stem cells. In this context, our lab has maintained a longstanding interest in the process of reprogramming somatic cells to a pluripotent status. Previously we examined the ability of undifferentiated mouse embryonic stem (ES) cell lines to reprogram the nuclei of mouse embryo fibroblasts (MEF) through cell-cell fusion. Activated baculovirus enabled fusion events in 70 to 85 percent of the cells, resulting in efficient reprogramming. The majority of resulting MEF/ES cell hybrids exclusively expressed ES markers and exhibited characteristics of normal ES cells.

When comparing the reprogramming potency of four established ES cell lines, however, we noticed that E14 cells stood out as significantly less potent. Analysis of histone modifications demonstrated that low reprogramming potency was correlated with reduced chromatin H3 lysine 9 acetylation levels, a key finding for this field.

More recently we have become well versed in generating ES–like mouse iPS cells by ectopic expression of four transcription factors originally described by Kazutoshi Takahashi and Shinya Yamanaka of Kyoto University, Japan.

Our next challenge is to adopt and refine this technology to generate human iPS cell clones from somatic cells derived from patients with specific disorders being studied by NIH intramural researchers. Neuronal cells differentiated from these iPS clones will be important for experiments studying neurological deficiencies in these patients.

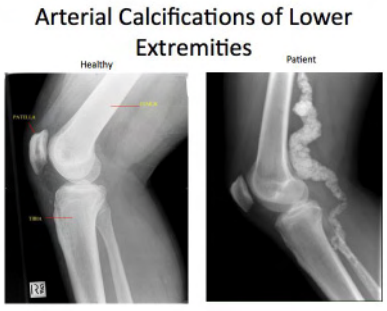
Rare or Undiagnosed Cardiovascular Disorders

Manfred Boehm, Laboratory of Regenerative Cardiovascular Medicine, and others in the NHLBI Translational Medicine Branch

We are at no loss for research concepts exploiting the new iPS cell frontier. One project we are pursuing is to develop iPS cells from patients with monogenic disorders to explore disease-linked signaling pathway alterations in iPS-cell-derived vascular progenitor cells and subsequently to investigate the utility of iPS cells in targeted drug approaches or large-scale drug screenings.

The vasculature is an omnipresent organ, directly regulating inflammatory responses through modulation of immune-cell adhesions, local cytokines, and growth factor production. The complexity of interactions between the vasculature and other organ systems requires the activation of most major signaling pathways within the vasculature.

Not surprising, mutations in these pathways have a vascular phenotype, such as JAK-STAT signaling in Job's syndrome (on which we are collaborating with Steven Holland and Alexandra Freeman, NIAID). Yet few vascular phenotypes for such mutations have been identified.



Manfred Boehm's group hopes to derive iPS cells to help patients with rare disorders such as vascular calcification, shown at right.

One way to explore this has been to obtain cardiovascular cells from patients with monogenic disorders for pathway identification and drug screening. This process unfortunately entails major surgical procedures to obtain enough tissue to isolate these cells. Reprogramming fibroblasts from skin biopsies into iPS cells, however, can provide a large pool of patient–specific vascular smooth muscle, endothelial progenitor cells, and cardiomyocytes.

Some of us are expanding this technology to generate human iPS–cell–derived cardiomyocytes from patients affected with arrhythmogenic right ventricular cardiomyopathy (with Toren Finkel) or generating functional iPS-cell-derived blood vessels in animal models from cells of patients with the newly described localized arterial calcifications syndrome. These iPS cells could be used for cell-based models of these debilitating conditions to discern novel mechanistic insights and to develop targeted therapies.

We also hope to generate porcine iPS cells and to use our capacity for noninvasive targeted myocardial cell delivery to test the therapeutic value of cardiac progenitor cells in a preclinical large animal model of advanced heart failure (with Robert Lederman).

As intramural researchers, we have the unique advantage of having unprecedented access to a variety of patients with unknown genetic disorders through the Undiagnosed Disease Program. Also, we can tap into the expertise of colleagues in the intramural research program and clinical center for the necessary clinical evaluation, genotyping of patient-specific skin fibroblast cultures of rare monogenic immune diseases the generation of patient–specific iPS cells, and characterizations of cardiovascular progenitor cells.

We anticipate that we soon will see the fruits of this high-risk venture. ■

Each of the preceding sections was written by the first scientist listed for that group.

NIH iPS Cell Center Award Program FY10 Award Recipients

The recently established iPS Cell Center requested proposals for intramural projects that focused on induced pluripotent stem cells (iPS cells). The goal was to support projects that accelerate clinical applications of iPS cell technology and/or initiate new approaches for the use of iPS cells in the clinic. Projects fell in a range of areas, including clinical research, preclinical animal models, methodology development, and the characterization of new or existing cell lines. Proposals could include research that used additional types of stem cells, but the focus had to be on iPS cells. Intramural principal investigators could request up to $200,000 in FY2010 funds for one-year projects. Eleven projects out of 71 applications were funded.

Christopher Austin, NHGRI
Development of iPS cell–based disease model of Niemann-Pick disease type C

Kenneth Boheler, NIA
Isolation of "homogeneous" human iPS cell populations with enhanced pluripotency and therapeutic potential using novel cell–surface glycoprotein marker panels

Toren Finkel, NHLBI
Cardiovascular applications of iPS cells

Kenneth Fischbeck, NINDS
iPS cells for mechanistic and therapeutic studies of motor neuron disease

Matthew Kelley, NIDCD
Induction of hair–cell regeneration using induced pluripotent stem cells

Michael Kuehn, NCI
Assessing the Smads2/3–dependent epigenetic landscape in iPSC

Paul Liu, NHGRI
Development of a reference set of comprehensively characterized iPS cell lines

Sheldon Miller, NEI
Restoring vision: Criteria for iPS cell–derived retinal pigment epithelia

Nicholas Restifo, NCI
Reprogramming tumor–specific T cells using iPS for cancer immunotherapy

Pamela Robey, NIDCR
Differentiation of human iPSCs into bone and cartilage

Daniel Weinberger, NIMH
Validation of human GABA inter–neurons derived from iPS cells

Stem Cell News and Resources

George Daley is coming on July 26; see Announcements on page 19.

For information on ongoing stem–cell seminars, visit the Web site for the Stem Cell Interest Group, http://sigs.nih.gov/SCIG, and click on "Meetings and Seminars."

The iPS workshop is archived at http://videocast.nih.gov/ram/stemcell011510.ram.

Visit the Web site for the NIH Stem Cell Unit at http://stemcells.nih.gov/research/nihresearch/scunit.

Literature Search

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"fluoroquinolone AND neuropathy" must be all that there is.

The NIH Library provides access to nearly 100 databases and each one has its unique strengths. Duberman, an informationist specializing in chemistry, regularly turns to PubMed for quick searches of largely English-language biomedical journals. PubMed is one of the most popular Web sites in the world, after all, and for good reason: It's comprehensive, easy to use, and free. For Duberman, the added convenience is that the NIH Library subscribes to most of the journals indexed in PubMed, and he can usually get the instant satisfaction of downloading a full-text article with one click. PubMed taps into the MEDLINE database maintained by the National Library of Medicine.

Another powerful yet underused database, Duberman said, is Embase (Excerpta Medica Database), Elsevier's biomedical and pharmacological database containing over 11 million records dating back to 1947. This expensive database, paid for by the NIH Library and therefore "free" to NIH researchers, has long been a favorite among librarians.

"Embase is our hidden weapon, our secret tool," Duberman said. Type in "fluoroquinolone AND neuropathy," for example, and you will get 36 results from 2010 to 1989, including PubMed's single return, which happened to be from 2001.

Embase contains everything in MEDLINE plus an additional 2,000 journals, particularly from Europe and Asia. It is essential for drug searches, Duberman said. Also unique to Embase are abstracts from 250 conferences, where "you can find a lot of the newer stuff in medicine first announced."

Embase also has a controlled vocabulary called Entree that is analogous to MEDLINE's MeSH (Medical Subject Heading) but twice as large. So it is more forgiving of the user's unfamiliarity with various synonyms and related spellings of drug and disease names.

The powerful Embase has its limits, though. "Lots of information is not necessarily the best information," Duberman said. "The trick is asking the right questions" with the right database.

The Cochrane Library, for example, is best suited for evidence-based medicine reviews and for results on effectiveness of health–care interventions and clinical trials, published or unpublished. TOXNET is best for information on toxicology and hazardous chemicals. Web of Science brings in more social science citations. Scopus includes patents, and some citations date back as far as 1823.

Another search consideration, Duberman said, is the type of end products you desire: original publications or data, reference works and textbooks (which synthesize information from original publications), bibliographic information, or digital copies, for example.

After the 2001 tragedy, Johns Hopkins University strengthened its research oversight to require that investigators work with a librarian and a pharmacist to help search the appropriate databases for a drug's potential side effects. Mount Sinai School of Medicine in New York, among other schools, now has a similar rule in place.

There are, however, no absolute safeguards, says NIH Library Director Suzanne Grefsheim. Even a comprehensive literature review may be limited if what it uncovers is not based on strong scientific evidence.

But to paraphrase the final line heard in so many television drug commercials: Talk to your librarian to see which database is right for you. ■

For more information visit the NIH Library's Web site:
http://nihlibrary.nih.gov

Under "Research Tools," you'll find a drop-down list with a link to "Databases."

Under "Quick Links," you'll also find a link to "Online Databases."

Under "Resource Training," you'll find information on training and classes.

Under "Library Services," click on "Ask a Librarian" to answer questions you can't find answers to.

NIH Director's Challenge Innovation Award Program

In the next few months, the Director's Challenge Innovation Award program will request applications for proposals to be funded in FY2011. The program awards a total of $1.5 million per year for projects that can be funded for up to two years, in the range of $50,000–$250,000 per year.

This program provides seed money to stimulate new research projects that are innovative and high-impact. The awards promote collaborative interactions among NIH intramural investigators from multiple institutes and centers. Preference is given to projects in chosen research areas, or themes, for that year's competition.

The three themes for this year are:

- High-throughput technologies, which include genome-wide RNA interference screens conducted at the newly established RNAi facility
- Translational research and biomarkers
- Methodology and technology development

Also welcome are other highly innovative projects that do not clearly fit into the above categories.

For more information and to read about the eight projects funded in the last cycle, visit http://sigs.nih.gov/challenge or contact Chuck Dearolf at dearolfc@mail.nih.gov or 301-402-1225. ■

—Chuck Dearolf, OIR

ANNOUNCEMENTS

Lecture: Induced Pluripotent Stem Cells for Disease Modeling
Monday, July 26, 3:00–4:00 p.m.
Masur Auditorium (Building 10)

George Q. Daley, M.D., Ph.D., the Samuel E. Lux IV Professor of Hematology and the director of the Stem Cell Transplantation Program at Children's Hospital Boston, will deliver a special WALS lecture this summer: "Induced Pluripotent Stem Cells for Disease Modeling." Important research contributions from Daley's lab include the creation of customized stem cells to treat genetic immune deficiency in a mouse model (together with Rudolf Jaenisch), the differentiation of germ cells from embryonic stem cells (cited as a "Top Ten Breakthrough" by *Science* magazine in 2003), and the generation of disease-specific pluripotent stem cells by direct reprogramming of human fibroblasts (cited in the "Breakthrough of the Year" issue of Science magazine in 2008).

Bio-Trac Workshops

"TRAC 29: Laser Capture Microdissection: Methods for Microgenomic Analysis"
Tuesday, August 3–Friday, August 6

"TRAC 7: Animal and Human Cell Culture: Method and Applications"
Monday, July 26–Friday, July 30
NIH

These FAES Bio-Trac workshops, which are team taught by active researchers, will include lecture and hands-on laboratory exercises. Each participant will receive a comprehensive binder containing all material presented in the workshop along with laboratory protocols and reference material. Registration is limited. For registration information contact Bea Sonnenberg at FAES (301-496-2316). For course schedule and content information as well as information on upcoming Bio-Trac workshops, contact Mark Nardone at nardonem@mail.nih.gov or 301-496-8290, or visit the Bio-Trac Web site at http://www.biotrac.com.

Wednesday Afternoon Lecture Series WALS resumes in the fall
Wednesdays, 3:00–4:00 p.m.
Masur Auditorium (Building 10)

September 8: Xiowei Zhuang (Harvard), "Nanoscopic Imaging of Biomolecules and Cells"

September 15: George Rose (Johns Hopkins), Make-Up from 2009–2010, "Protein Folding: Seeing Is Deceiving"

September 22: Jeremy Nathans (Johns Hopkins), George Khoury Lecture: "The Evolution of Primate Color Vision"

September 29: Connie Cepko (Harvard), Margaret Pittman Lecture: "Strategies to Slow the Onset of Blindness in Retinitis Pigmentosa"

For more information: http://wals.od.nih.gov.

International Opportunities Expo
Friday, September 17, 2010
Natcher Conference Center (Bldg. 45)

This all–day event provides a great opportunity for NIH postdoctoral fellows, visiting fellows, and graduate students to network with science and technology representatives and find out about overseas research, grants, and job opportunities. In its seventh year, the Expo will feature career–development sessions on finding a job and developing professional networks abroad, non–bench careers, and hot areas of research. A list of speakers and exhibitors will be disseminated via e-mail. Sponsored by Fogarty International Center and OITE. For details: http://felcom.od.nih.gov/subCommittee/vfc/index.aspx.

NCI's "Immunity, Inflammation and Cancer" Symposium
Thursday, September 23–Friday, September 24; 8:30 a.m.–5:00 p.m.
Masur & Lipsett Auditoriums (Bldg. 10)

International leaders in cancer and inflammation will provide an exciting forum for discussion on the state of current understanding of this field. Target audience: researchers interested in the latest developments in the role of inflammation in development and progression of cancer. Sessions will include cancer immunity and immunosurveillance, cancer and inflammation, the microbiome's role in immunity, tissue homeostasis and cancer, and the tumor microenvironment. Seating is limited so register early. Registration closes August 20, 2010. For more information and to register online, visit http://web.ncifcrf.gov/events/cancerinflammation/2010. The event will be videocast live on the Web (http://videocast.nih.gov).

NIH Research Festival
Tuesday, October 5–Friday, October 8
Natcher Conference Center (Bldg. 45)

The action-packed week will include scientific symposia, poster sessions, the scientific equipment tent show, and more. Meet colleagues from around the corner or across the campus. For more information, visit http://researchfestival.nih.gov or follow us on Twitter @NIHResearchFest.

Workshop: "Skills Desirable for Senior Scientific Research Leaders"
Presented by: Office of Intramural Research; Office of Equal Opportunity and Diversity Management
Date TBD; 2-hour session
Lipsett Auditorium (Building 10)

Learn about NIH's scientific governance structures and how they vary among institutes and centers; and factors considered in the selection of senior research leaders (such as scientific directors and lab and branch chiefs). Presentations will include talks by speakers from the Intramural Research Program, panel discussions featuring several scientific directors, and a question-and-answer session moderated by Michael Gottesman, Deputy Director for Intramural Research. The intended audience includes, but is not limited to, NIH senior, principal, tenured, and tenure-track investigators. The workshop will be videocast (http://videocast.nih.gov). For more information, contact Tyrone Banks at 301-451-9692 or Bankstc@mail.nih.gov. Sign language interpreters will be provided. For reasonable accommodations, contact Mary Okwaro at 301-496-2906 or the Federal Relay Service at 1-866-377-8642.

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National Institutes of Health
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MSC 0183
Bethesda, Maryland 20892

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Publication No. 10-6250

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Catalytic Reactions?

If you have a photo or other graphic that reflects an aspect of life at NIH (including laboratory life), a quotation, or a confession that scientists might appreciate and that would be fit to print in the space to the right, why not send it to us via e-mail: catalyst@nih.gov; fax: 301-402-4303; or mail: *The NIH Catalyst*, Building 1, Room 333.

Also, we welcome "letters to the editor" for publication and your reactions to anything on the *Catalyst* pages.

In Future Issues...

- Undiagnosed Diseases
- Malaria Research
- Pain Research

Laboratory Confessions:

Going Down

By Name Withheld

Sir Isaac Newton figured out long ago that objects on Earth fall at a rate of 9.8 meters per second squared. He calculated this roughly 300 years before the construction of the NIH Clinical Center. Drop an elevator from the 14th floor of the Clinical Center outside of Masur Auditorium, and it will fall at an average speed of 9.8 meters per hour.

Further defying physics, the elevator's speed downward is inversely proportional to mass. More bodies and more mass translate into a slower fall. Going up isn't much different. A Hyundai can accelerate faster.

And for this reason, I confess, I pushed the "close" button as someone tried to jump on. Worse, I pretended I was trying to push "open." I feigned a shout of "sorry" through the nearly closed doors and heard an anguished cry in return, for that person was faced with the sudden realization that he'd be waiting 10 minutes for the next elevator ride. I believe he spilled coffee on his shirt in the rush to beat the closing door, all in vain.

Selfishly, I couldn't have been more pleased with my act of debauchery. Not letting that guy on the elevator meant I would be back in my lab by 1:00 p.m. instead of 1:15 p.m. Hold it for one guy, and you're holding it for the next person . . . and the next. Pretty soon you have 12 people going to 12 different floors plus some bozo who pushes the wrong floor by mistake. Worse, three of those people will be having some tedious conversation about sports.

What's 15 minutes, you might ask? Well, that's a good chunk of any one of the mandatory training courses I have to take. Then there's that refrigerator I need to clean out, the perplexing purchase forms I need to complete, various people I need to chase down for signatures . . . and oh, yeah, science. The possibilities are endless.

So if you find yourself on the wrong side of a closing elevator door, rest assured that the person inside controlling the buttons is not as good as you in managing time and is doing the best she can to get the science done.

If you have a laboratory confession you'd like to share, please contact us (see "Catalytic Reactions?" at left to find out how).

The NIH Catalyst is published bimonthly for and by the intramural scientists at NIH. Address correspondence to Building 1, Room 333, NIH, Bethesda, MD 20892. Ph: 301-402-1449; fax: 301-402-4303; e-mail: catalyst@nih.gov

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