FALL 2012

HEALTHSPAN

Buck Institute for Research on Aging

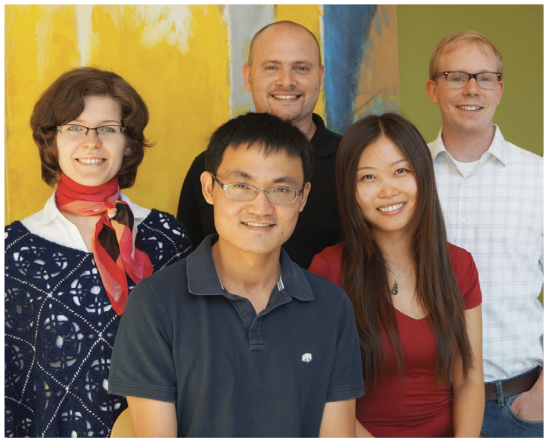
Glenn Foundation Postdocs Start Research Projects

Postdoctoral fellows are the lifeblood of Buck Institute research, doing the yeoman's work in our 19 laboratories, and sparking interdisciplinary research with their colleagues. A recent $1 million grant from the Glenn Foundation will fund two years of research for 10 scientists, each of them a "Glenn Foundation Training Fellow in the Biology of Aging."

"The Buck Institute has an excellent track record of training and preparing leading researchers in the mechanisms of biological aging and its relationship to chronic disease," said Mark Collins, President of the Glenn Foundation for Medical Research. "Our founder, Paul F. Glenn, has a long history of providing support to the Buck Institute and its scientists. We are delighted to continue this support via the establishment of these training fellowships."

Two of the awardees are senior postdocs, already at work in Buck labs: **Jim Flynn** is a mouse biology expert in the Melov lab. He will be looking at mouse models of osteoporosis and determining whether reducing mTOR signaling (induced by the drug rapamycin) influences age-related bone loss. mTOR is a regulatory protein that controls growth, metabolism and protein turnover which integrates signals from the cell and from the environment to sense nutrient and energy conditions. Jim has a previously established body of work on mTOR signaling in the heart. His project asks a new question that explores the potential benefits of mTOR inhibition as a means of extending the healthspan of our skeletal system.

Irina Perevoshchikova's project is aimed at determining ways to decrease the severity and incidence of type 2 diabetes. Irina has given herself a particularly challenging task—determining the rates and mitochondrial sites of free radical production in pancreatic beta cells, something that has not been previously attempted in any cell type. Mitochondria are the power houses of the cells. Free radicals are a natural product of mitochondrial metabolism. In pancreatic beta cells native rates of free radical production are thought to be involved in the secretion of insulin, the hormone involved in blood sugar control. But too many free radicals can cause problems. Irina says discovering the sites and rates of free radical production in pancreatic beta cells is essential to determining how pharmacologic interventions might assist optimum function of those cells with age.



Glenn postdocs: (clockwise) Irina Perevoshchikova, Ilan Riess, Jim Flynn, Chong He, and Hansong Deng

Four new postdocs have received fellowships; the remaining hires will be announced in late October: **Hansong Deng** received his PhD with honors from Tsinghua University, China. He has joined the Jasper lab, arriving from the UCLA Geffen School of Medicine where he built a track record of outstanding work on the role of Parkinson's disease genes and their impact on mitochondrial dynamics. At the Buck he will analyze the effects of mitochondrial dynamics on age-related dysfunction in adult stem cells. Hansong's work will bridge the interests of several laboratories at the Buck and is expected to foster many collaborations.

Daniel Edgar comes to the Lithgow lab from the Karolinska Institute in Sweden, where he worked on mitochondrial DNA mutations and aging. Daniel will be looking at the relationship between metal toxicity and aging in the nematode worm—a new area of inquiry in the Lithgow lab. Preliminary data indicate that an organism loses the ability to maintain the proper balance of metals as it ages and that this loss contributes to age-associated mortality.

Chong He recently finished her PhD at Peking University. She is initiating

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Postdoctoral scholars hold a doctoral degree and are engaged in a temporary period of mentored research in order to acquire the professional skills needed to pursue a career path of their choosing.

Become a Member of the Buck Institute!

Join now to receive an invitation to the Fall Membership Luncheon presentation, "Prevention as Cure –The Next Generation of Wellness," to be given by Denise Kalos, VP, Wellness Programs at the Institute. Unable to attend? Buck Members can see a video of the presentation using our new "Members only" portal on our website. Contact Masha Shifs, Director of Regional Development @ 415-209-2239 or mshifs@buckinstitute.org for details.

"Awesome" Discovery Day Planned This Fall Where Kids Can Unleash Their Inner Scientist

The Buck Is Bringing Science out of the Lab and into the Community

Bay Area SCIENCE FESTIVAL

The Bay Area Science Festival (BASF) kicks off its second annual celebration on Saturday, October 27, with a North Bay Discovery Day at the Sonoma County Fairgrounds in Santa Rosa. The free event, which runs from 11 a.m. to 4 p.m., will bring together students from throughout the region to experience the excitement of science. The Buck Institute is providing project leadership and coordination for all North Bay BASF activities and is an exhibitor at this event.

"Last year at Infineon Raceway we expected 500 visitors at Discovery Day and more than 4,000 came," said volunteer Carole Bennett, a retired instructor from Santa Rosa Junior College. She and Linda McDougal, Project Coordinator at the Buck, are co-chairs of this year's event. This fall, planners anticipate attracting up to 6,000 people from Napa, Marin, and Sonoma counties. "The word is getting out. Discovery Days are like taking the San Francisco Exploratorium on the road throughout Northern California," said Bennett.

More than 40 exciting experiments, demonstrations and exhibits are being planned for the family-friendly event. A team of Buck scientists will make liquid nitrogen ice cream—a major hit at last year's Discovery Day. Youngsters can extract DNA from strawberries, launch rocket balloons, blow giant soap bubbles (while learning how soap kills germs), and save a robot patient admitted to a virtual hospital. The popular "Mentos Reaction" show will return, demonstrating the chemical reaction that occurs when candy mints are combined with diet soda.

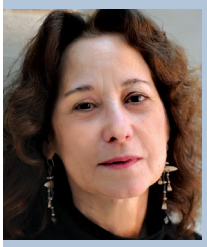
"All the exhibits are designed to be hands-on and highly interactive. We want young people to start thinking about North Bay careers in Science, Technology, Engineering and Mathematics (STEM) and select courses that will lead them in that direction. STEM jobs exist and we want kids to know that," McDougal said. "We're working closely with Kaiser Permanente, Agilent Technologies, Santa Rosa Junior College, Technical Instruments, the Press Democrat, the engineering firm GHD, the North Bay Leadership Council and a host of other organizations to make this program a success," she added.

Organizers are making a special effort to reach out to all demographics in the North Bay. To help promote Discovery Day, 15,000 bilingual flyers are being distributed to schools in the three-county area, supplemented with email blasts inviting teachers to bring their students. Teachers are being encouraged add this special one-day program to their curriculum.

The North Bay Discovery Day is the first event of the 10-day BASF which lasts through Saturday, November 3, when the festival finale will be held at AT&T Park.

Buck Faculty Judith Campisi, PhD, Gets Funding to Tackle a "Provocative Question" in Cancer Research

The National Cancer Institute (NCI) is going after the major unsolved or neglected problems in oncology. And it is asking Buck faculty Judith Campisi, PhD, to help do it. Campisi will receive more than $420,000 to grapple with one of 24 "provocative questions" aimed at stimulating NCI's research community. Her question: How does the lifespan of an organism affect the molecular mechanisms of cancer development, and can we use our deepening knowledge of aging to enhance prevention or treatment of cancer?



"In the developed world, 90 percent of the cancers seen in the clinic are in people 50 years or older," said Campisi. "Understanding which features of aging change the rate of tumor incidence would allow researchers to identify potential biological processes that could be targets for prevention and therapy."

Cancers have been commonly associated with aging presumably because of the accumulation of mutations affecting cancer genes. But Campisi says mutations aren't necessarily enough to give cancer a foothold in the body. Her project will delve into cellular senescence—the process that occurs when cells permanently lose the ability to divide—and its role in the development of cancer.

Senescence has long been seen as a defense against cancer—damaged cells shut down when they become at risk of proliferating uncontrollably. But groundbreaking research in the Campisi lab has shown that senescence comes with a price. Cells spew inflammatory cytokines when they enter the "zombie" state associated with senescence. Campisi says the inflammation can harm nearby cells in ways that promote cancer. "We think senescence helps create an environment in the tissues that encourages cancer to grow," said Campisi. "Given the fact that we have more cells becoming senescent as we age, we think this could explain the patterns of carcinogenesis we see during the aging process."

Campisi's "provocative question" research will rely on mouse models and involve a collaboration with the Melov lab. The scientists will cross a mouse genetically engineered to have its senescent cells die (rather than go into that "zombie"

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Buck Launches New Membership Program

Additional Benefits Include Exclusive Online Access to Scientific Presentations

Donors can now join the Buck in an exciting new membership program that has been inaugurated at the Institute to build on the foundation of the existing Acorn Society, while adding a variety of informative and exclusive features.

In the past those involved with the Buck came mostly from the local community. Today there is growing interest in the Institute outside of the North Bay—from those across the U.S. as well as from people in many foreign countries.

"There is a growing awareness of the important role the Buck is playing in global health. We want to find better ways to keep our loyal and valued friends close to us and better informed about new scientific advances no matter where they live," said Masha Shifs, Director of Regional Development.

"We plan to use technology to help us enhance access to information and learning opportunities for Buck Members as we enlist their support in funding our research programs, educational activities and expansion projects," she said.

The Buck has a long history of engaging with the public. Formed in 2004, the Acorn Society grew to nearly 500 members; donors contributing gifts of $250 or more annually were recognized by invitations to special luncheon presentations where they learned about scientific developments before public announcements were made. They also received preferred seating at Community Seminars and other Institute events. These benefits will continue to be an integral part of the new membership program.

Current Acorn Society members will automatically become Buck Members and the established donation for membership will not change.

Now Members who are unable to attend the luncheon presentations, due to scheduling conflicts or geographic challenges will be able to "virtually attend" by accessing videos of the presentations online. Buck Members will receive a special password to access exclusive information using the Buck website. They will also receive flash emails highlighting research breakthroughs and important Institute announcements. "Our goal is to keep our supporters connected, informed and empowered, while enabling them to keep abreast of all Buck activities and ways they can embrace healthy aging," Ms. Shifs said. "Furthermore, they can use our secure and private membership web portal when making contributions."

In addition, a donor wall will be installed in the lobby of the Institute to honor Members making an annual contribution of $500 or more. Members will also be prominently acknowledged in the Institute's annual report and each will receive a unique new membership lapel pin as a visible token of appreciation.

"The personal touch is the hallmark of a successful membership program. We know our donors and celebrate special occasions with them. Many make more than one annual gift to the Buck in honor of loved ones, graduations and birthdays. Some even provide a gift of membership for a friend or other family members," said Shifs.

As the Buck strives to maintain a parallel series of high-level research projects—while expanding its capacity to address new areas of study, adding scientists and state-of-the-art equipment, and increasing educational outreach efforts—there is a corresponding need for continued funding.

"We also intend to grow by working hard to increase our donor base to finish our construction program with the remaining buildings in the master campus plan," said James Edgar, Chair of the Buck Institute Board of Trustees. "Members are extremely important to us. They comprise our primary grassroots organization providing the financial aid needed to achieve important objectives. Becoming a Member of the Buck is a terrific way to share the Institute's vision, to have an insider's view of new developments, and to get excited about what it does. If you have not already done so, I urge you to consider becoming a Member of the Buck as this expanded program gets underway," Mr. Edgar said.

(Campisi, Continued)

state) with a mouse prone to develop skin cancer. "We believe this research will lead to a model to study all types of cancer," said Campisi. "Our goal is a deeper understanding of the molecular links between aging and cancer. In addition to developing therapies, we are also hoping to identify new markers for early diagnostic tests and risk assessment."

The NCI's Provocative Questions project emerged from discussions among a number of veteran cancer researchers who noticed there were many questions that begged for answers. Over the course of 18 months, NCI settled on 24 questions that, if answered, could lead to significant research advances. For example, one question is aimed at understanding the link between obesity and cancer; another seeks to determine whether improved measurement technologies can be used to better ascertain exposure to cancer risk.

More than 700 researchers applied for funding to research the questions. The Buck's Campisi is among the fewer than 60 who received awards.

BUCK INSTITUTE

Buck Institute for Research on Aging

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Free, docent-led tours take place Thursday mornings. To reserve a date, please call 415.209.2245.

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The Buck Institute is the nation's first independent research facility focused solely on understanding the connection between aging and chronic disease.

www.theBuck.org

Glenn Foundation

(Cont. from front page)

a new project in the Kennedy lab to develop small molecules that extend both lifespan and healthspan. This project – in collaboration with Texas A&M University – involves screening small molecules for specific effects on the yeast cell cycle that correlate with longevity. One molecule has already been shown to significantly delay yeast aging and several others are being tested. Her project will determine whether the molecules affect aging in multiple invertebrate species and elucidate their mechanisms of action.

Ilan Riess is now a member of the Lamba lab. His work, involving stem cell technology, will help drive forward efforts to understand and develop therapies for macular degeneration. Ilan received his PhD from the University of Turin, Italy. His research is focused on retinal regeneration by reprogramming human fibroblasts either into induced pluripotent stem cells or directly into photoreceptors.

Buck CEO Brian Kennedy Receives Senior Scholar in Aging Award from Ellison Medical Foundation

"I am very grateful to the Ellison Medical Foundation for this honor and for the fact that they fund research that is not usually supported by traditional sources."

Buck Institute CEO Brian Kennedy, PhD, has received a Senior Scholar in Aging award from the Ellison Medical Foundation. The prestigious $600,000 grant will allow Kennedy to move longevity research now underway in yeast and worms into mice.

Kennedy wants to understand why reduced gene expression in ribosomes enhances longevity in invertebrates. Ribosomes are tiny organelles in cells that are involved in the production of proteins. Kennedy wants to identify all the mechanisms involved in this lifespan extension and to see if those same mechanisms are active in mice. The research is aimed at determining whether the reduced gene expression promotes healthspan and delays the onset of age-related diseases in the mice.

"Armed with this knowledge, it may be possible to develop human therapeutics that mimic activities within the cell," said Kennedy. "This would give us another targeted approach to our efforts to extend the healthy years of life." The Ellison Medical Foundation supports basic biomedical research, with a current focus on understanding how humans and other organisms age, and on defining the fundamental biological mechanisms that prevent age-related diseases and disabilities. The Foundation particularly aims to stimulate new, creative research approaches that might not be funded by traditional sources or that have been neglected by existing U.S. research funding programs.