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Winter/Spring 2011

Stem Cell Lines

HSCI
HARVARD STEM CELL INSTITUTE

Seeding Innovation, Independence, and Success

HSCI's Seed Grant Program's high 'return on investment'

Every spring, approximately 10 investigators at HSCI-affiliated institutions receive the exciting news that they have received an HSCI seed grant, which provides two years of funding, totaling $180,000, for researchers engaged in diverse areas of stem cell research aligned with HSCI's mission.

The Seed Grant Program, which in the past six years has awarded more than $11 million to 63 recipients, is very competitive. Every year, recipients are selected by a multi-institutional committee of HSCI faculty members from a pool that typically consists of 50-60 highly qualified candidates. While the grants are frequently awarded to early career scientists, any investigator, no matter how experienced, may be considered if he or she is exploring a new avenue of research related to stem cells.

What makes HSCI seed grants so valuable to recipients is that they fund projects that are difficult, if not impossible, to fund from other sources because they are high risk, are early stage, or lack sufficient preliminary data. In fact, sometimes they are all three.

With this funding and access to HSCI's extensive resources and assistance, many HSCI seed grant recipients have been able to acquire the data and experience necessary to compete subsequently for major grants from the National Institutes of Health, disease foundations, and industry. "According to a recent internal survey we conducted, seed grant recipients received on average three times our initial investment in subsequent funding," said HSCI Executive Director Brock Reeve. "By any standard, that's a very high return on investment."

'Broad ideas'

One case in point is Paul Yu, MD, PhD, of Massachusetts General Hospital. Yu was awarded a 2009 seed grant for his project aimed at identifying bone-forming progenitor cells in diseases characterized by the formation of pathologic bone, typically within skeletal muscle and connective tissues and often in response to injury. In addition to contributing to a greater understanding of these incurable, life-limiting diseases — the first step toward treatment — Yu's research seeks to find out how this maladaptive repair response might ultimately be exploited for regenerative purposes to engineer bone for individuals in whom bone is lost due to injury or disease.

Based on the findings from his seed-grant funded work, Yu was recently awarded a highly competitive federal RO1 grant, which typically provides from $100,000 to $250,000 a year for up to four or five years, to continue his research in this area. "What makes the HSCI seed grants so valuable is that they

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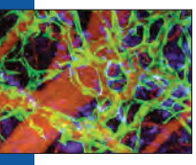
INSIDE







HSCI Seed Grant recipients (left to right, from top): Paul Yu, MD, PhD, Caroline Burns, PhD, Paola Arlotta, PhD, William Pu, MD, and Stephen Haggarty, PhD.

Seed Grant Program

...continued from page 1

fund broad ideas that may not have all the preliminary data," said Yu. "I'm very fortunate to have received this support, as my seed grant enabled me to generate the data required to compete successfully for the RO1, which will allow me to continue this research."

'Truly invaluable'

Seed grant recipient Caroline Burns, PhD, also of Massachusetts General Hospital, has submitted applications for three federal grants based on the work initiated through her HSCI seed grant. Burns has received positive scores on her submissions and expects to learn in the coming months that some, or perhaps all, have been awarded. Her 2008 seed grant-funded research was focused on understanding the mechanisms by which adult zebrafish regenerate their heart muscle — a process that might conceivably be activated in people whose hearts have been damaged by heart attacks.

"My seed grant was truly invaluable on two levels," said Burns. "First, it allowed me to switch my research focus and go off in a different, exciting new direction [cardiac regeneration]. It also enabled me to acquire sufficient data to apply for federal funding, which simply would not have been possible otherwise."

Thanks to her 2008 seed grant, Massachusetts General Hospital neuroscientist Paola Arlotta, PhD, was able to create cells that resemble corticospinal motor neurons (CSMNs) from neural progenitor cells. Creating CSMNs for drug screening is of keen interest to Arlotta and many other scientists because they are one of two neuronal cell types that die in amyotrophic lateral sclerosis (ALS, or Lou Gehrig's disease) and are the cells that are permanently damaged in spinal cord injury.

'A real confidence builder'

"With the seed grant funding, I was able to acquire the data that enabled me to get an RO1 grant plus a continuation of funding from a disease foundation," said Arlotta. Her findings were also recently published in *Nature Neuroscience* — exposure that Arlotta said gets her "off and running" in terms of getting additional support. As is the case with most other seed grant recipients, it is not only the money that Arlotta found so valuable. "Receiving an HSCI seed grant is important to junior faculty because it's a real confidence builder at a time in your career when you need it," she said.

Children's Hospital Boston researcher William Pu, MD, used the funds from his 2008 seed grant to pursue research of epicardial cardiac progenitor cells and their potential role in contributing to the repair of heart muscle. "HSCI support came at a pivotal time when my start-up funding was winding down and my research program was picking up," said Pu. His seed grant enabled him to obtain the data to get an RO1 grant, as well as gain additional support as a member of the Progenitor Cell Biology Consortium.

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Rossi Receives Major Funding from New York Stem Cell Foundation

Derrick Rossi, PhD

At its annual research conference in October, the New York Stem Cell Foundation (NYSCF) announced the first six recipients of its new Investigator Program, which is supported by grants from the Robertson Foundation and The Leona M. and Harry B. Helmsley Charitable Trust. Among the awardees was HSCI principal faculty member Derrick Rossi, PhD, who was named one of four NYSCF-Robertson Investigators.

Describing the investigators as "some of the world's most gifted minds," NYSCF CEO Susan L. Solomon said that the foundation's program provides each of its investigators with $1.5 million over the next five years. The funds will help expand recipients' laboratories and foster innovative research aimed at exploring the potential of stem cells to advance the understanding and treatment of disease.

"This funding supports young scientists at a critical juncture in their careers as they focus on research that has the potential to accelerate the path from bench to bedside," said Solomon. Over the next five years, the program will provide funding for a total of 19 investigators.

Selected by a four-member committee chaired by HSCI Co-Director Douglas A. Melton, PhD, applicants were required to show true innovation in the translation of basic science to the clinical setting. Rossi, who heads a lab at the Immune Disease Institute at Children's Hospital Boston, leads a group of researchers who are focusing on the biology of hematopoietic (blood-forming) stem cells, as well as cell reprogramming aimed at producing clinically useful cell types.

Rossi's findings made international headlines last fall when his lab announced a safer, far more efficient way to reprogram adult human skin cells to a pluripotent state using synthetic mRNA. Rossi's group also demonstrated that mRNA could be used to safely and efficiently direct cell fate — a requirement for regenerative medicine to become a viable treatment option.

Volume 6
Number 1
Winter/Spring 2011
Stem Cell Lines

Harvard Stem Cell Institute

The Harvard Stem Cell Institute (HSCI) is a scientific collaborative established in 2004 to fulfill the promise of stem cell biology as the basis for the cure and treatments for a wide range of chronic medical conditions. HSCI is a unique enterprise that unites experts across the disciplines, schools, and departments of Harvard University and all its affiliated hospitals. HSCI depends on the vision and generosity of individuals, foundations, and corporate donors to carry on its research, training, and programs. Extensive information about HSCI may be found on our website: www.hsci.harvard.edu.

Stem Cell Lines is published three times a year for friends and supporters of HSCI. Inquiries from the public are welcomed; e-mail brock_reeve@harvard.edu.

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Salon Focuses on New Imaging Technologies for Stem Cell Research

Sometimes science progresses because researchers come up with new theories to test and prove. Other times, collaborators from different fields are able to tap into each other's expertise to find novel solutions. And sometimes it's a new technology that allows both old and new questions to be answered. At a recent HSCI salon, which focused on "New Technologies for Imaging Cells," all three of these avenues of discovery were fostered.

"The aim of this salon is to discuss new technologies that may catch your imagination and lead to new collaborations," said faculty moderator Richard Lee, MD, leader of HSCI's Cardiovascular Disease Program. HSCI's salons give members of the HSCI community a chance to review and discuss the latest research on a specific topic in a relaxed environment.

Tracking stem cells as they divide, differentiate into more specific cell types, and migrate to different parts of the body is called fate mapping. Imaging techniques in this enormously active field of research are currently limited in three ways: resolution, toxicity, and the qualitative nature of the results. During the salon's first presentation, Matthew Steinhauser, MD, of Brigham and Women's Hospital, showed how he and his colleagues hope to address these issues by using a technology called multi-isotope imaging mass spectrometry.

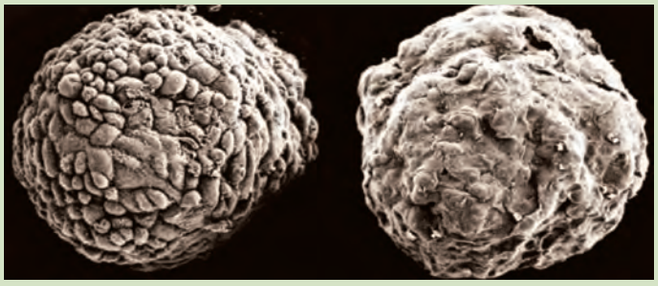
The second presentation, by Cesar Nombela Arrieta, PhD, of Children's Hospital Boston, focused on the quantitative analysis of samples using laser scanning cytometry. This technology, which is a cross between a flow cytometer and a static image cytometer — two more common research tools — uses bone marrow imaging to understand the hematopoietic (blood-forming) system. Future experiments will help determine how hematopoietic stem cells function in the diverse microenvironments of the bone marrow, answering questions such as where they need to be in the bone or the vascular system to "succeed."

Charles Lin, PhD, of Massachusetts General Hospital, gave the final presentation on the ability to track a single cell in a living organism. This four-dimensional visualization technology (three dimensions plus time) developed by Lin allows researchers to follow a single stem cell in real time. Lin and his colleagues are currently working to expand this technology's capabilities to include lineage tracking and gene expression.

The second HSCI stem cell salon of the academic year, "Stem Cells and Drug Discovery," which was held in early February at Harvard Medical School, will be covered in the next issue of *Stem Cell Lines*.

And the Winners Are…

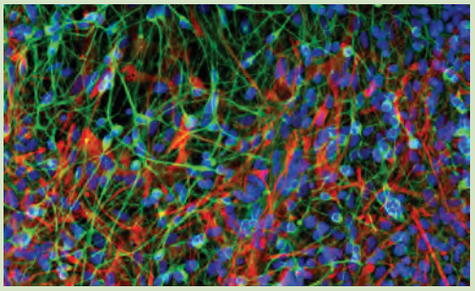
In conjunction with the HSCI salon "New Technologies for Imaging Cells," investigators were asked to submit images of stem cells as part of a contest. We are pleased to publish the three winning submissions.



First Place

Submitted by: Renita Horton, doctoral candidate, Harvard School of Engineering and Applied Sciences (Debra Auguste, PhD, PI)

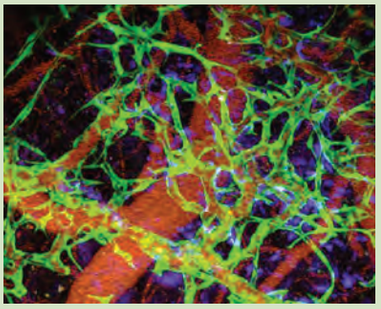
Description: The evolution of the extracellular matrix on the surface of human embryonic stem cell-derived embryoid bodies



Second place

Submitted by: Rakesh Karmacharya, MD, PhD, Broad Institute/McLean Hospital

Description: Human induced pluripotent stem (iPS) cell-derived neuronal culture: neurons/Tuj1 (green), glia/GFAP (red), nuclei/DAPI (blue)



Third place

Submitted by: Rekha Samuel, MD, Rakesh K. Jain, PhD, and collaborator David Scadden, MD, Massachusetts General Hospital

Description: Creation of functional blood vessels *in vivo* derived from induced pluripotent stem (iPS) cells (green); red blood cells (red)

American Society of Hematology Honors Two HSCI Leaders

Photos courtesy American Society of Hematology

Left: HSCI Executive Committee Chair Leonard Zon, MD, speaking at the American Society of Hematology (ASH) annual meeting. Right: HSCI Co-Director David Scadden, MD (right), accepting his award plaque from ASH President Hal Broxmeyer, PhD. Both Zon and Scadden were honored with prestigious awards at the ASH annual meeting.

In December, HSCI Co-Director David Scadden, MD, and HSCI Executive Committee Chair Leonard Zon, MD, were each presented with a prestigious award from the American Society of Hematology (ASH), the world's largest professional society of blood specialists.

Scadden, of Massachusetts General Hospital, and Zon, of Children's Hospital Boston, were among a group of six eminent scientists honored by the society for making significant contributions to the understanding and treatment of hematologic diseases. The awards were presented at the 52nd ASH Annual Meeting in Florida.

Scadden was presented with the 2010 Dameshek Prize for his landmark contributions to stem cell biology. The society noted that Scadden has increased the fundamental understanding of the stem cell niche and how cells engage it, and that his contributions have altered the thinking in the field and given direction for interventions to improve transplantation.

Zon was recognized with the E. Donnall Thomas Lecture and Prize for his pioneering research of the development and regulation of hematopoietic (blood-forming) stem cells. This prize, named after a Nobel Prize laureate and past ASH president, recognizes pioneering research achievements in hematology.

Miles Davis, courtesy of the Helmsley Charitable Trust

Type 1 Diabetes Research Consortium Meets

The Type 1 Diabetes Research Consortium, a multi-institutional collaborative program of The Leona M. and Harry B. Helmsley Charitable Trust, held its annual meeting in New York City in October. Established in 2009 to better understand the causes of type 1 diabetes and explore potential therapies, the consortium encompasses 11 institutions and 45 investigators through 28 grants totaling $21.8 million.

HSCI Co-Director Douglas Melton, PhD (far left), is one of four members of the consortium's Scientific Steering Committee. With Melton are (left to right): committee member Rudy Leibel, MD, Columbia University; Helmsley Charitable Trust Trustee David Panzirer; Program Director Dana Ball; and committee members Matthias Hebrok, PhD, University of California, San Francisco, and Mark Atkinson, PhD, University of Florida.

Gift Directed Toward Future Stem Cell Scientists

Jim Rosenthal

Jim Rosenthal, who has generously supported HSCI since 2005 through gifts to the institute's general fund, recently made a pledge to support Harvard's efforts to educate future generations of stem cell scientists — undergraduates who are taking courses in the university's Department of Stem Cell and Regenerative Biology.

Rosenthal, a Harvard graduate, is CEO of Kaplan Ventures, which develops and grows innovative companies at the intersection of education, technology, and compliance. The company's portfolio includes businesses such as test prep and English-language instruction in Israel, online high schools, compliance training, and partnerships with universities to get degree programs online and to recruit and train international students.

"We've always been intrigued by the possibilities of stem cell research, and there is no better place to do this work than Harvard, which has so many of the innovators in the field," said Rosenthal. "My wife and I love that we have the opportunity to support programs that benefit undergraduates in this department — the innovators of the future — and feel fortunate that we can play a role in such an important endeavor. Harvard is the leader in both stem cell science and education, so we can't think of a better investment with greater potential."

This gift dovetails with an HSCI-sponsored undergraduate educational program. The HSCI Internship Program, now in its sixth year, is an intensive summer stem cell research experience that combines coursework and a lab internship for undergraduates from around the world (see *Stem Cell Lines*, Fall 2010, page 6). About half of the 35 intern positions are reserved for Harvard undergraduates, who often use the opportunity to begin pre-thesis research.

Interdisciplinary Team Discovers New Genetic Elements of Cell Reprogramming

'Another Set of Keys to Play on the Genomic Piano'

An interdisciplinary group of leading Harvard geneticists and stem cell researchers has found a new genetic aspect of cell reprogramming that may ultimately help with the fine-tuning of induced pluripotent stem (iPS) cells into specific cell types.

The researchers identified a set of genetic elements — large intergenic non-coding RNAs, or lincRNAs — never before known to be involved in cellular reprogramming. The scientists, whose study was published online in November by *Nature Genetics*, have affiliations with HSCI, the Broad Institute of Harvard and Massachusetts Institute of Technology, Harvard's Department of Stem Cell and Regenerative Biology (SCRB), Children's Hospital Boston, and Beth Israel Deaconess Medical Center (BIDMC).

"This is the first time that this new type of RNA gene has been implicated in the reprogramming process," said John Rinn, PhD, a corresponding author of the study who is affiliated with HSCI, SCRB, the Broad Institute, and BIDMC. "It's important to find as many routes to reprogramming as possible. This finding gives us another set of keys to play on the genomic piano that controls the 'music' of cellular reprogramming.

"This is a group of RNAs that comes from the dark region of the genome," said Rinn. Unlike the RNA messenger molecules that play a key role in the production of proteins, these genes act through their RNA form. "We don't know everything they do, but they clearly are involved in the reprogramming process."

"We know reprogramming resets the genome [of the reprogrammed cell] globally," said George Daley, MD, PhD, of HSCI and Children's Hospital Boston and, along with Rinn, one of the two senior authors of the *Nature Genetics* paper. "What we've learned by working with John [Rinn] is that lincRNAs play essential roles in the reprogramming process. We've even identified one lincRNA that enhances reprogramming, which is tantalizing evidence that we can make reprogramming more efficient by harnessing lincRNAs."

Stephanie Mitchell/Harvard News Office

John Rinn, PhD, and Sabine Loewer, PhD, are part of an interdisciplinary group of scientists that discovered a new genetic aspect of cell reprogramming.

The road to this discovery began when Rinn first arrived at Harvard and the Broad Institute in early 2009. He, Broad Institute Director Eric Lander, PhD, and Mitchell Guttman, PhD, who are also authors on the *Nature Genetics* paper, discovered a group of 5,000 lincRNAs. "We then worked with George [Daley] to figure out their relevance in reprogramming," Rinn said. These results demonstrate again the value of interdisciplinary collaboration and its power to accelerate fundamental research.

Artful Donation to Cure Diabetes

In October, representatives of Art of the Cure (AOTC), which raises money to find a cure for type 1 diabetes, presented HSCI Co-Director Douglas Melton, PhD, with a check for $90,000 to go toward diabetes research under his direction. The funds were raised at an AOTC-hosted summertime event on Cape Cod, where works of art and unique crafts donated by renowned Cape artists were auctioned.

Present at the check passing were (from left): Laurie Young, AOTC committee member; Brock Reeve, HSCI executive director; AOTC representatives Sandy O'Connor, clerk; Stephen O'Connor, president; and Adrienne Tanashian, board member; Douglas Melton, PhD, HSCI co-director; AOTC board member Jane Harvey; and treasurer Bill Bessette.

B.D. Colen/ADIOL

HSCI Pilot Grants Support Fresh Ideas and Innovation

Fresh ideas and innovation are the lifeblood of biomedical research, particularly in a field like stem cell biology, which is in its relative infancy. Only by pursuing every potentially promising avenue of inquiry can stem cell science advance rapidly toward its goal of improving human health.

To encourage novel ideas and approaches, HSCI recently initiated a series of pilot grants within its disease programs. These grants provide stem cell researchers — often young investigators at the start of their careers but also more seasoned scientists — with funds to pursue innovative basic, translational, or clinical research projects that are likely to have a significant impact on the field but are not likely to be funded by other sources.

Unlike HSCI's other funding programs, such as the Junior Faculty Programs or Seed Grants, the pilot grants are disease-specific and aligned with the unique scientific challenges and priorities of HSCI's Disease Programs. To date, the Kidney Disease Program and the Cancer Program have awarded seven pilot grants to investigators throughout the Harvard community (see sidebar, below). The Blood Diseases Program, led by HSCI principal faculty member Daniel Tenen, MD, recently issued its first call for research proposals, and other disease programs may follow suit in the future.

Kidney Disease Program

The first to award pilot grants was the Kidney Disease Program, which is co-led by HSCI principal faculty members Benjamin Humphreys, MD, PhD, and Andrew McMahon, PhD. In the first round of funding, four grants were awarded; up to four will be awarded in the second round, which will be announced in the spring of 2011. Each project is funded to a maximum of $36,000 a year and may be carried out over six to 12 months.

As with the first round of funding, this year's pilot grants will be awarded to investigators whose research is focused on proximal tubule-associated components of the kidney. Proximal tubules, which are part of the kidney's nephrons (the functional part of the kidney) are considered the segment of nephrons that are most amenable to regenerative therapies.

While projects are evaluated primarily on the basis of their individual scientific strength, preference is given to those that complement ongoing Kidney Disease Program projects, as this helps build a strong foundation for collaborative research proposals for future federal funding.

Cancer Program

The Cancer Program, co-led by HSCI principal faculty members Scott Armstrong, MD, PhD, and Ramesh Shivdasani, MD, PhD, has awarded three pilot grants, which began in November.

Providing one to two years of funding at $100,000 a year, the grants were awarded to investigators whose research projects support the Cancer Program's mission — to identify critical genes and pathways that sufficiently distinguish normal stem cells from cancer-initiating stem cells, which would be candidate targets for therapy. Among the criteria for award selection were the projects' potential to promote future collaborative research, which accelerates the pace of discovery and also provides data with which to seek external funding.

One project is focusing on distinguishing lung tumor-propagating cells from normal lung stem cells — differences that will enable the identification of therapeutic targets in lung cancer, the major cause of cancer deaths worldwide. Another is looking at the role of a specific cancer-causing gene in the self-renewal and maintenance of cancer stem cells in pancreatic cancer, a particularly lethal type of cancer that claims 95 percent of patients within five years. A third project is aimed at developing an integrated system that will enable researchers to track single stem cells *in vivo* to gain a greater understanding of the biology of malignant and normal stem cells.

HSCI PILOT GRANT RECIPIENTS

Kidney Disease Program

Principal Investigator	Institution
Raghu Kalluri, PhD	Beth Israel Deaconess Medical Center
Xue (Sean) Li, MD, PhD	Children's Hospital Boston
M. Todd Valerius, PhD	Beth Israel Deaconess Medical Center
Aleksandr Vasilyev, MD, PhD	Massachusetts General Hospital

Cancer Program

Principal Investigator	Institution
Ronald DePinho, MD	Dana-Farber Cancer Institute
Carla Kim, PhD	Children's Hospital Boston
Andrew Kung, MD, PhD*	Dana-Farber Cancer Institute
Charles Lin, PhD*	Massachusetts General Hospital

** Kung and Lin are co-principal investigators on a single collaborative project.*

$1 Million Dollar Gift Supports Stem Cell Research

Scott Schoen

Since its creation, HSCI has relied on the vision and generosity of individual donors to support its research. In fact, the institute was launched with a major challenge grant from a Harvard Law School alumnus and his wife who believed in the promise of stem cell research and its power to transform medicine. This philanthropic tradition continues with a recent major gift to HSCI by Scott Schoen, a graduate of Harvard Business School and Harvard Law School.

Schoen directed $1 million to help establish the HSCI-Massachusetts General Hospital Center for Regenerative Medicine (CRM) Fund. The fund will be used to support investigators, programs, and projects within the CRM that are aligned with HSCI's mission, including research, education, training, and faculty recruitment. Founded and led by HSCI Co-Director David Scadden, MD, the CRM is an integral part of HSCI and home base to many renowned HSCI faculty.

> "As a philanthropist, you're always looking to find something that strikes the right chord with you. [Stem cell research] is a potential new path to curing disease, which is very compelling and worthy of our strong support."
>
> – Scott Schoen

Schoen is a vice-chairman of Thomas H. Lee Partners, a leading Boston-based private equity firm, where he is currently a director of the Nielsen Company. He is on the Board of Trustees of Partners Continuing Care and the Board of Advisors of Yale School of Management, and is an active member of the CRM Advisory Board.

Schoen became intrigued by the work of the CRM in 2007, when he attended an event about stem cell science. He became "hooked" by the potential of stem cell research, and particularly the pioneering work of Scadden and others, to transform the understanding and treatment of many intractable diseases. "As a philanthropist, you're always looking to find something that strikes the right chord with you," said Schoen. "This is a potential new path to curing disease, which is very compelling and worthy of our strong support."

"This fund, which gives the Center for Regenerative Medicine the resources to accomplish so much in many key areas, was one of the first joint fundraising efforts between HSCI and one of its affiliated institutions," said Scadden. "We anticipate that it will be a model for future joint efforts that will give other philanthropists the opportunity to direct their gifts to a specific institution while also supporting HSCI's mission."

HSCI Faculty Receive Awards for Achievement and Leadership

Society for Biomaterials Young Investigator Award recipients Jeffrey Karp, PhD (left), and Ali Khademhosseini, PhD

Two HSCI faculty members from Brigham and Women's Hospital were recently awarded the 2011 Young Investigator Award from the Society for Biomaterials (SFB). In April, Jeffrey Karp, PhD, and Ali Khademhosseini, PhD, will receive their awards at the SFB Annual Meeting and Exposition in Florida.

Each year for more than a decade, SFB has recognized young investigators from around the world who demonstrate outstanding achievement and leadership in the field of biomaterials research. The awardees are selected from a review of international nominations.

"This is such a great honor," Karp said. "It is great to receive this along with my good friend, Ali Khademhosseini, whom I have known since graduate school." Karp's research focuses on stem cell engineering biomaterials, medical devices that sense travel through tissues, and gecko-inspired medical adhesives — recently selected by *Popular Mechanics* as one of the "Top 20 New Biotech Breakthroughs That Will Change Medicine." He was also recognized in 2008 by Massachusetts Institute of Technology's *Technology Review* magazine as one of the top 35 innovators in the world under the age of 35.

"This is a very humbling experience given the long legacy of this award and its previous recipients," said Khademhosseini. "I am very happy to share this with Jeff Karp, a great friend and colleague." Khademhosseini conducts research based on developing microscale and nanoscale technologies to control cellular behavior, with a particular emphasis on developing microscale biomaterials and engineering systems for tissue engineering.

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Seed Grant Program

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'A jewel of the Boston research community'

"A real success story," is how Stephen Haggarty, PhD, of Massachusetts General Hospital, describes his experience as a 2008 seed grant recipient. "This support was truly the seed that enabled me to get the preliminary data for federal funding consisting of both an R21 and R01 grant and to jump-start my ability to obtain additional private funding," he said. Haggarty's HSCI-supported research centered on creating induced pluripotent stem (iPS) cell models of the single-gene disorder Fragile X syndrome, the most common heritable form of intellectual disability, and elucidating a pathway that is implicated in its development as a potential target for treatment.

That work was a springboard for much of Haggarty's current research, which is aimed at creating stem cell models of complex, multigenic neuropsychiatric disorders, such as bipolar disorder and schizophrenia. Here again, being able to create and study human neurons in a dish and follow their development and ability to form functional synapses opens up new avenues for understanding diseases and discovering treatments.

"HSCI's Seed Grant Program is just one example of the institute's inclusive and supportive model, which gives investigators like me access to state-of-the-art technologies and, more importantly, intellectual input from world-class stem cell scientists," said Haggarty. "It is truly a jewel of the Boston research community."

New Fellowship Recipient Named

HSCI recently announced the establishment of an HSCI Fellowship in affiliation with the Broad Institute, a collaboration between Harvard and Massachusetts Institute of Technology (MIT). The fellowship will provide three years of crucial support to an early career investigator affiliated with HSCI and the Broad Institute.

The first recipient of the new fellowship is Tarjei S. Mikkelsen, PhD. Mikkelsen received his bachelor's and master's degrees from MIT and his doctoral degree in bioinformatics and integrative genomics from the Harvard-MIT Division of Health Sciences and Technology. Mikkelsen is a member of the Broad Institute's Genome Biology Program and Epigenomics Initiative.

Courtesy of Broad Institute (Maria Nemchuk)

Tarjei S. Mikkelsen, PhD

During his graduate studies, Mikkelsen was first author on numerous papers in leading scientific journals, such as *Nature*. Most recently, in October, he was co-first author (with Zhao Xu, PhD, of Beth Israel Deaconess Medical Center) of a paper in *Cell* that reported the discovery of two new factors that regulate the formation of fat, which is an important step toward better understanding metabolic disorders such as diabetes and obesity.

An expert in bioinformatics who also conducts laboratory research, Mikkelsen will divide his time between the Broad Institute and Harvard's Department of Stem Cell and Regenerative Biology. Going forward, his research will focus on better understanding mammalian gene regulatory networks for the purpose of developing strategies for manipulating cellular states. His laboratory will pursue complementary lines of research in this area, using integrative genomic and epigenomic approaches. Mikkelsen's lab will also collaborate with other HSCI investigators to provide specialized expertise in integrative genomics and computational analysis.

> "This fellowship allows me to...start tackling important problems in stem cell biology immediately."
>
> – Tarjei S. Mikkelsen, PhD

"It is very time consuming and often extremely difficult to obtain federal funding for the type of high-risk/high-yield research I'm engaged in," said Mikkelsen. "This fellowship allows me to bypass this lengthy process and start tackling important problems in stem cell biology immediately."