

## IMPROVING HUMAN HEALTH THROUGH COLLABORATIVE SCIENTIFIC DISCOVERY

The Life Sciences Institute serves as Michigan's hub for collaborative biomedical research on human health problems. The LSI harnesses the strength and tradition of academic excellence at the University of Michigan by forging links between the health sciences, basic sciences, engineering, the social sciences, and the humanities.

Interdisciplinary science is the feature of LSI's annual symposia. They are designed to encourage the exchange of ideas and to provide the opportunity for students and scientists alike to interact with and learn from prominent scientific leaders about recent developments.

*Art illustrates a section of mouse forebrain with red neurons, green astrocytes and blue nuclei. Neural progenitors in this section give rise to new neurons throughout life but this neurogenesis declines during aging.*

*Includes discrimination based on gender identity and gender expression.*

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MAY 9, 2007

WEDNESDAY 9:00 AM - 5:00 PM  
BIOMEDICAL SCIENCES RESEARCH BUILDING AUDITORIUM

# FRONTIERS IN STEM CELL BIOLOGY

UNIVERSITY OF MICHIGAN  
LIFE SCIENCES INSTITUTE  
6TH ANNUAL SYMPOSIUM



Life Sciences Institute

MAY 9, 2007

WEDNESDAY 9:00 AM - 5:00 PM

HOMOLOGICAL SCIENCES RESEARCH BUILDING AUDITORIUM

# FRONTIERS IN STEM CELL BIOLOGY

UNIVERSITY OF MICHIGAN  
LIFE SCIENCES INSTITUTE  
8TH ANNUAL SYMPOSIUM

9:00 am

Welcome

Alan Salliel  
*Director, Life Sciences Institute*

MORNING MODERATOR

Sean Morrison

*Director, Center for Stem Cell Biology; Research Associate Professor, Life Sciences Institute; Investigator, Howard Hughes Medical Institute; Associate Professor, Department of Cell & Developmental Biology, U-M Medical School*

9-1.5 am

Mary Sue and Kenneth Coleman Life Sciences Lecture:

Control of Stem Cells

*Introduction by Stephen Forrest, U-M Vice President for Research*

Stuart H. Orkin, MD

*David G. Nathan Professor of Pediatrics, Harvard Medical School  
Chair, Department of Pediatric Oncology*

Dana Farber Cancer Institute

*Investigator, Howard Hughes Medical Institute*

**Introduction by Stephen Forrest**

*U-M Vice President for Research*

Dr. Stuart Orkin's research focuses on stem cell biology, particularly the development and function of the blood system, the relationship between cancer and stem cells, and the mechanisms responsible for self-renewal of stem cells. His laboratory studies gene regulation as it pertains to the properties and development of stem cells. His efforts are directed toward understanding the nature and function of genes that control the self-renewal and differentiation processes and how disturbances in gene networks may lead to cancer. In addition to studying adult stem cells or progenitors for the blood system and the heart, his laboratory has investigated the nuclear factors that control self-renewal of mouse embryonic stem cells. One goal is to identify basic mechanisms that are employed by different types of stem cells, and perhaps reveal molecular pathways shared among stem cells. Dr. Orkin is an elected member of the National Academy of Sciences, the Institute of Medicine, and the American Academy of Arts and Sciences.

AFTERNOON MODERATOR

Yukiko Yamashita

*Research Assistant Professor, Life Sciences Institute; Assistant Professor, Department of Cell & Developmental Biology, U-M Medical School*

1:30 pm

Maintenance and Renewal of Blood and Muscle Stem Cells

Amy Wagers, PhD

*Assistant Professor of Pathology, Harvard Medical School*

*Investigator in Developmental and Stem Cell Biology, Joslin Diabetes Center*

*Harvard Stem Cell Institute*

The broad interest of Amy Wagers' lab is to identify and characterize tissue-specific stem cell populations in adult animals. The work focuses on understanding the factors controlling the migration and expansion of hematopoietic stem cells in mice, as well as developing methods for the isolation and manipulation of stem and progenitor cell populations in skeletal muscle. Among other honors, she is a recipient of the Burroughs Wellcome Fund Career Award in Biomedical Sciences and the Smith Family New Investigator Award.

10:30 am

Engagement of a Stem Cell Niche

David T. Scadden, MD

*Professor of Medicine, Harvard University*

*Cochair, Harvard Stem Cell Institute*

*Director, Center for Regenerative Medicine*

*Massachusetts General Hospital*

Dr. David Scadden's lab studies how stem cells are regulated, develop rational methods for manipulating them, and apply stem cell therapies to regenerate immunity in cancer and AIDS. He is particularly interested in the regulation of entry and exit from the cell cycle, as this has important implications for expansion of stem cells and gene transduction. He is also interested in the regulation of stem cell localization to and within specific microenvironments and the interactions of stem cells with elements of the microenvironmental niche. These studies are critically important in understanding how stem cells develop and how they may function in regenerative processes in many organs. He has received many honors, including elected membership in the American Society for Clinical Investigation and the Association of American Physicians.

2:30 pm

Stem Cells in the Planarian *Schmidtea mediterranea*

Alejandro Sánchez Alvarado, MD, PhD

*Investigator, Howard Hughes Medical Institute*

*Professor of Neurobiology and Anatomy*

*University of Utah School of Medicine*

Regeneration is a fundamental attribute of all living things, whether it be simple tissue restoration or the complete replacement of lost body parts such as limbs, tails, or even heads. The goal of the Alejandro Sanchez Alvarado lab is to identify and characterize the molecular and cellular components underpinning regeneration using the freshwater flatworm (an organism called Schmidtea mediterranea, or planaria). The Sanchez Alvarado's lab has developed the molecular tools needed to reveal how regeneration works in this flatworm. By identifying and characterizing regeneration at the molecular and cellular level, he hopes to gain a better understanding of how higher organisms, including humans, develop biologically. Among other honors, he has won the Marcus Singer Award and an Albert L. Ryan Fellowship Award.

1:30 am

Controls of Germline Stem Cells in *C. elegans*

Judith Kimble, PhD

*Investigator, Howard Hughes Medical Institute*

*Vilas Professor, Department of Biochemistry*

*University of Wisconsin*

Judith Kimble studies controls of growth, patterning, and morphogenesis during animal development. Her work focuses on the regulation of germline stem cells and organ polarity. Using the nematode *Caenorhabditis elegans*, her lab has uncovered genes, proteins, and pathways fundamental to the development of all animals, including humans. Kimble is an elected member of the National Academy of Sciences, American Academy of Arts and Sciences and the American Philosophical Society among other honors and awards.

3:45 pm

The Use of Embryonic Stem Cells in Regenerative Medicine

Robert Lanza, MD

*Vice President of Research & Scientific Development, Advanced Cell Technology*

*Alumni Professor, Institute of Regenerative Medicine, Wake Forest University School of Medicine*

Dr. Robert Lanza's current area of research focuses on the use of stem cells and regenerative medicine including nuclear transfer and stem cells in human transplantation. His recent published work describes the rescued visual function in animals using retinal pigment epithelial cells derived from human embryonic stem cells and a method for deriving stem cells using a single-cell approach that does not harm embryos. Among many other awards and honors, Dr. Lanza is a former Fulbright Scholar and has been nominated for a John D. and Catherine T. MacArthur Foundation Fellowship award.