**MISSION STATEMENT**

The mission of the UC Santa Barbara Center in Stem Cell Biology and Engineering is to foster an interdisciplinary program of stem cell research and teaching to develop new technologies in the emerging field of regenerative medicine, with research focused on:

- **MOLECULAR MECHANISMS** of stem cell pluripotency, proliferation and differentiation. (12 Laboratories)
- **BIOTECHNOLOGY AND BIOENGINEERING** of stem cell growth, differentiation, sorting and delivery. (11 Laboratories)
- **REGENERATIVE MEDICINE** with research targeted to specific diseases. (5 Laboratories)

UC Santa Barbara is well positioned to make unique, significant contributions in stem cell research, with extraordinary enabling technologies in bioanalytics, systems biology, nanotechnology, microprocessing, biomanufacturing, and fundamental biomedical research.

Our approaches are distinct from those at California medical schools, with our emphasis on basic biological questions and engineering challenges related to stem cell research.

UCSB’s renowned faculty includes five winners of the Nobel Prize and scores of elected members of national and international academies and societies. UCSB was ranked 6th in the nation in Natural Sciences among public universities in the 2009 rankings by US News and World Report. Searches are underway to hire additional faculty members engaged in innovative stem cell research.

The Center for Stem Cell Biology and Engineering has grown rapidly thanks to crucial grant support from the California Institute for Regenerative Medicine, including a Major Facilities Grant, a Shared Laboratory Grant, 2 Training Grants, and a Tools and Technology Grant. Additional funding comes from the National Institutes of Health, the California Institute for Regenerative Medicine, the Darl and Linda Dickey Foundation, the University of California, First Avenue Garden, South Coast Business Park, and numerous private individuals, including James Doerr, Wanda Hoge, and Liliana E. Jones.

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**A SAMPLE OF ONGOING RESEARCH PROJECTS**

### Induced Pluripotent Stem Cells

Molecular basis of pluripotency.

James A. Thomson
Co-Director, UCSB Center for Stem Cell Biology and Engineering; MacArthur Chair, UIUC; Scientific Director, Wold Stem Cell and Regenerative Biology, Margevich Institute

### Stem Cells in Model Systems

Molecular and genetic control of development in the nematode *C. elegans*; the genetic basis of stem cell competence states; micro RNA control of proliferation and differentiation in the stem cell niche.

Joel Rothman
Professor, Molecular, Cellular and Developmental Biology; Director, Woods Hole Embryology Source

### Nanotechnology and Cancer

Cell adhesion and tumor metastasis; tissue-specific vascular "zip codes" for delivery of nanoparticles to specific tissue targets; novel synthetic matrices to support hESC survival, proliferation, and delivery to specific niches.

Ertki Ruoslahti
Professor, Molecular, Cellular and Developmental Biology, Sarium Institute for Medical Research at UCSB

### Cell Sorting Biotechnology

High throughput cell screening, including novel methods for sorting hESC derivatives; molecular screening and directed evolution; integrated biosensors.

H. Tsoh
Co-Director, Center for Stem Cell Biology and Engineering; Professor, Department of Materials and Mechanical Engineering

### Macular Degeneration

Cellular and molecular processes that cause age-related macular degeneration; ocular differentiation of human embryonic stem cells.

Lincoln V. Johnson
Director, Center for the Study of Macular Degeneration, Neuroscience Research Institute

### Alzheimer’s Disease

Micro RNA regulation of neural differentiation of human embryonic stem cells; Autism and Alzheimer’s Disease.

Kenneth S. Kosik, M.D.
Hanneman Professor of Neuroscience Research, MCDB - Co-Director, Neuroscience Research Institute