UC San Diego
UC San Diego News Center

Nov 14, 2011

Spotlight on Faculty Research: Stem Cell

Shu Chien
University Professor & Chair

Dr. Chien and his colleagues have developed an array system (with thousands of combinations) that allows the rapid determination of the optimum physical and chemical conditions that direct the differentiation of stem cells into specific cell types. The ability to control stem cell differentiation to desired cell types is crucial for the use of human embryonic stem cells for regenerative medicine, and hence the results of this study will be valuable for almost all types of stem cell research. More...

Sylvia Evans
Associate Adjunct Professor of Medicine

Sylvia Evans is researching human embryonic stem cells aimed at developing therapies for heart failure and cardiac pacemaker dysfunction. To repair of human heart, it is important to study human cardiac progenitors and to define pathways required to grow and differentiate them utilizing human cells as a model experimental system. Evans' lab will create special lines of human embryonic stem cells that become fluorescent when they adopt the cardiac progenitor, heart muscle, or pacemaker state, with the aim of obtaining sufficient numbers of specific cell types for cardiac therapy. More...

Anirvan Ghosh
Professor of Biology

Ghosh is researching whether forebrain neurons can be generated from human embryonic stem cells. Several neurological disorders, such as Alzheimer's disease, are characterized by loss of forebrain neurons. Scientists believe cell replacement might provide a therapeutic strategy if they could generate neurons that had the same properties as the cells that are lost. While scientists have previously generated neurons from embryonic stem cells, Ghosh's project seeks to specifically generate forebrain neurons from embryonic stem cells and determine if they can make connections with existing neurons in the brain. More...

Lawrence S.B. Goldstein
Professor of Cellular and Molecular Medicine; Investigator, Howard Hughes Medical Institute, UCSD School of Medicine

Dr. Goldstein is researching Alzheimer's disease, a progressive, incurable disease that robs people of their memory and ability to think and reason. Goldstein is studying key genetic clues that come from a rare familiar form of the disease, which suggest that early defects in the physical transport system responsible for long-distance movements of information in neurons can cause neuronal dysfunction.

Goldstein's lab will use human embryonic stem cells to generate human neuronal models of hereditary Alzheimer's disease in order to test various hypotheses about the cause of the disease, as well as test new drugs for its treatment. More...

Catriona Jamieson

Assistant Professor of Medicine, Hematologic Malignancies Program

Dr. Jamieson is researching cancer stem cells derived from human embryonic stem cells. Compelling studies suggest that human cancer stem cells (CSC) arise from aberrantly self-renewing, tissue-specific stem or progenitor cells which are responsible for cancer propagation and therapeutic resistance. Human embryonic stem cells can provide a potentially limitless source of tissue-specific stem and progenitor cells in vitro, so represent an ideal model system for generating and characterizing human cancer stem cells. This research harbors tremendous potential for developing life-saving therapy for patients with cancer by providing a platform to rapidly and rationally test new therapies. More...

Martin Marsala

Professor, Anesthesiology Cancer Symptom Control Program

Dr. Marsala hopes his research with human embryonic stem cells will one day soon allow people who are suffering from spinal ischemic injury to improve their motor function. Ischemia-induced paraplegia, often combined with spasticity and rigidity of muscles, is a serious complication that sometimes occurs when patients undergo a surgical procedure to repair an aortic aneurysm. These symptoms also occur in many patients with traumatic spinal injuries. Marsala's recent studies have demonstrated that spinal transplantation of rat and human neurons leads to significant improvement in motor function. More...

Cornelis Murre

Professor of Biology

Murre is working on a research project to generate long-term multi-potential human hematopoietic progenitor cell lines from human embryonic stem cell cells. If successful, the strategy would create cells that could be used to readily generate specific hematopoietic cell types, such as lymphocytes or dendritic cells, on a large scale for cell-based therapeutic approaches. More...

Mana Parast

Assistant Professor of Pathology

Parast is interested in the development and function of the placenta, a unique transient organ essential for proper fetal development. The overall goal of the laboratory is to understand placenta-based diseases at the molecular level. They are also funded by the California Institute for Regenerative Medicine to develop a human trophoblast stem cell model for studies of early implantation errors, which lead to disorders of placental function. More...

Bing Ren

Assistant Professor of Cellular and Molecular Medicine

Dr. Renis working on a research project to provide a foundation for analysis of the mechanisms that control the production of stem cell proteins, which in turn would help in the design of new ways to manipulate the stem cells so they can differentiate toward specified cell types. The knowledge base

resulting from this research will directly support the effort by Ren and other California researchers to investigate the mechanisms of stem cell biology, and design new stem cell therapies. More...

David Traver

Assistant Professor of Biology

David Traver studies the remarkable zebrafish for new insights into the biology of hematopoietic stem cells. As a CIRM New Faculty Award winner, Dr. Traver will determine the genetic factors necessary to create HSCs from mesoderm by applying the unique advantages of the zebrafish system. Zebrafish embryos are transparent, and he has recently created transgenic animals that possess fluorescent HSCs. His group can therefore combine genetic analyses with the direct imaging of HSC behavior in living embryos to provide an unprecedented view of HSC development. More...

Yang Xu

Associate Professor of Biology

Xu is investigating two major mechanisms that are thought to maintain genetic stability in human embryonic stem cells. His research is aimed at identifying pathways that promote efficient DNA repair as well as pathways that regulate self-renewing capabilities of these stem cells in the absence and presence of DNA damage. The goal is to promote efficient self-renewal of human embryonic stem cells with minimum genetic instability â€“ critical for the development of human therapeutics. A major objective of Xu's proposed research is to improve the genetic manipulation technologies of human embryonic stem cells, including transgenic and gene-targeting technologies, in order to significantly improve scientists' capability to generate disease-specific human stem cell lines. More...

Binhai Zheng

Assistant Professor of Neurosciences

Zheng is working on a research project to apply genetically modified human embryonic stem cells to study basic functions of human genes in spinal cord development and to develop therapeutic intervention for spinal cord injury. More...

Benjamin D. Yu

Assistant Professor of Medicine and Dermatology

Benjamin Yu studies the molecular mechanisms of organ regeneration. As a model, he studies the regeneration of the hair follicle. During each hair cycle, an entirely new hair follicle is regenerated by an adult stem cell population. His group will determine the initial steps that control proliferation and organize the new hair follicle. His laboratory is generating cell-permeable cell cycle activators to transiently stimulate adult stem cell proliferation with the goal of developing an approach to activate human adult stem cell proliferation in other organ systems and to initiate the process of regeneration. His work is now sponsored through a CIRM New Faculty Award. More...