

The Berkeley Human Embryonic Stem Cell Shared Research Laboratory

Grant Award Details

The Berkeley Human Embryonic Stem Cell Shared Research Laboratory

Grant Type: Shared Labs

Grant Number: CL1-00519-1.2

Project Objective: Provide facilities and services for stem cell research community.

Investigator:

| | |
|---------------------|------------------------------------|
| Name: | David Schaffer |
| Institution: | University of California, Berkeley |
| Type: | PI |

Award Value: \$1,673,221

Status: Closed

Progress Reports

Reporting Period: Year 1

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Reporting Period: Year 4

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Reporting Period: Year 7/NCE

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Grant Application Details

Application Title: Human Embryonic Stem Cell Shared Research Laboratory

Public Abstract: Investigators from three major regional research and clinical institutions have instituted a stem cell research center. Numerous collaborations among our community of investigators have successfully utilized both Federal registry and non-registry human embryonic stem cell (hESC) lines in the center; however, the available resources for the culture and maintenance of these lines place inherent limitations on the research. We therefore propose to establish a Human Embryonic Stem Cell (hESC) Shared Research Laboratory for cell culture and investigation, which will serve as a central resource to greatly enhance stem cell science and technology in the region.

This resource will greatly benefit numerous ongoing research project areas. First, the ability of human embryonic stem cells to self-renew, that is grow and maintain their ability to differentiate into presumably every cell type in the adult body, is a hallmark property this is incompletely understood. Investigations of self-renewal mechanisms will lead to improved approaches to mass produce these cells for numerous therapeutic and diagnostic applications. In addition, understanding how hESCs differentiate into blood cells will enhance the treatment of numerous disorders including cancer, diabetes, and infectious disease. Moreover, studying how hESCs differentiate into numerous types of neurons will have implications for neurodegenerative disorders, including Parkinson's Disease and Lou Gehrig's Disease. Furthermore, regenerative medicine efforts to engineer new cardiomyocytes and blood vessels will improve the treatment of heart disease and congestive heart failure, still the leading loss of life in the United States. Importantly, the ability to control and harness hESCs as a limitless source of differentiated blood cells, neurons, cardiomyocytes, and other cell types will also greatly enhance high throughput drug screening, toxicology screens, and diagnostics efforts. Finally, novel bioengineering approaches to create robust and scaleable technology platforms for expanding, differentiating, and grafting hESCs will benefit all such therapeutic and diagnostic applications.

The Shared Research Laboratory will be located in two nearby sites on the host institution, within a new building and a modern biological sciences building, to provide convenient access to all researchers on campus and in the surrounding community. The Laboratory will provide a central repository and resource for culture and maintenance of numerous lines, and imaging and cytometry analysis. The Laboratory will also build upon our strong tradition of and success with shared core facilities to synergistically enhance our stem cell research capabilities. The resulting culture and analytical facility will thus provide a strong, shared resource to benefit stem cell research in the regional community.

Statement of Benefit to California: Our Human Embryonic Stem Cell (hESC) Shared Research Laboratory will strongly enhance the scientific, technological, and economic development of California. The most important net benefit will be to human health.

The Laboratory will meld three outstanding research institutions: a university with a history of major contributions to the scientific knowledge and technological capabilities of the State, a research institution that bridges basic science with clinical translation, and a national laboratory with leading research in genomics and cancer biology. This collective expertise is poised to make major advances in stem cell biology and engineering, which will be greatly stimulated by the establishment of a collaborative laboratory for hESC research.

Our proposed Laboratory includes leaders in cell biology, developmental biology, immunology, neuroscience, and bioengineering. This expertise is being applied to understand mechanisms that control hESC self-renewal and differentiation, and the resulting advances will help establish California as a leader in stem cell biology. Furthermore, our team has leaders in regenerative medicine and bioengineering who apply basic biological information to create technology platforms for expanding, differentiating, and grafting hESCs for therapeutic and diagnostic applications. Collectively, this work will impact the treatment of cancer, autoimmune disease, infectious disease, heart disease, and neurodegenerative disorders.

Furthermore, we have a long and successful tradition of translating science into practice through interactions with industry and the clinic. Continuing this history in the area of stem cells will enhance the technological strength and economic development of the State. Finally, this Laboratory will provide a collaborative training environment that will expose many students and fellows to leading, interdisciplinary science and technology, thereby creating valuable future employees of California.

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