

\$45 Million Headed for Stem Cell Research in California

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The 29-member Independent Citizens Oversight Committee (ICOC), governing board of the California Institute for Regenerative Medicine (CIRM), today approved 72 grants totaling approximately \$45 million over two years, to researchers at 20 academic and non-profit research centers throughout the state. The grants were selected from among 231 applications totaling more than \$138.3 million from 36 California institutions

"Today is a day for great hope. These initial grants are important because we all know that we cannot afford to wait when it comes to advancing potentially life-saving science," said Governor Arnold Schwarzenegger. "This research brings hope for an eventual end to the suffering from chronic disease - such as Alzheimer's disease, cancer or multiple sclerosis - and promise for the people who love someone with one of these terrible illnesses."

ICOC Chairman Robert N. Klein said, "Today marks another milestone in one of the most important public endeavors ever undertaken by California. Patients and families around the globe will take heart that human embryonic stem cell research is finally beginning to receive the funding it needs and deserves. We are grateful for the Governors leadership on this critical project, for the support of private philanthropists, and for the votes of seven million Californians who made this day possible by voting for Proposition 71."

Scientific Excellence through Exploration and Development (SEED) Grants were intended to bring new ideas and new investigators into the field of human embryonic stem cell (hESC) research, and offer an opportunity for investigators to carry out studies that may yield preliminary data or proof-of-principle results that could then be extended to full scale investigations.

"Our intent was to bring new ideas and new talent to human embryonic stem cell research and these grants do exactly that," said Zach W. Hall, Ph.D., CIRM's President and Chief Scientific Officer. "They are going to 30 scientists who are new to the field of stem cell research and 27 who have been independent investigators for six years or less. The quality of the science that is being proposed is very high, which bodes well for the future of stem cell research in California."

The ICOC voted to name these grants in honor of Leon J. Thal, M.D. Dr. Thal was a professor and chair of the Department of Neurosciences at the University of California, San Diego. He was one of the worlds leading experts on Alzheimers disease and a Governors appointee to the ICOC. He died earlier this month when the plane he was piloting crashed.

The ICOC originally planned to approve up to 30 grants totaling \$24 million in August, 2006, following Governor Schwarzenegger's authorization of a \$150 million loan to CIRM from the state's general fund. It is slated to approve up to another 25 for \$80 million in March, for research conducted by established stem cell scientists.

"We were amazed by the large number of applications that we received. Because of their high quality it was important to increase the number of awards and the amount of money granted," said Klein. "These projects will truly jump start stem cell research in California."

The grants will fund a broad range of projects, including:

- An attempt to direct hESCs to generate specific types of forebrain neurons and see if they can functionally integrate into cortical circuits (UC San Diego)
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- An examination of the role of mitochondria in hESC differentiation (UCLA)
- A study of the role of a specific gene family in guarding the genome of hESCs, drawing upon previous research with HIV and other retroviruses (Gladstone Institutes)
- An attempt to identify small molecules that target a specific signaling pathway to support self-renewal or direct differentiation of hESCs, using a chemical genetic approach (UC Riverside)
- Generation of a library of hESC lines that model a number of human genetic diseases (Burnham Institute)
- Development of cutting-edge imaging techniques to view how heart cells derived from hESCs repair and restore myocardial function (Stanford)
- A study of how mutations in mitochondria affect the stability of hESCs and their ability to grow and develop into nerve cells (UC Irvine)

The ICOC approved Leon J. Thal SEED Grants to the following researchers(**Note: the dollar amounts shown are the two-year budgets requested by each applicant and are subject to review and revision by CIRM, prior to the issuance of grant awards**):

Application #	Principal Investigator	Institution	Title	Amount
RS1-00161-1	Blelloch, Dr. Robert Hector	University of California, San Francisco	MicroRNA Regulation of Human Embryonic Stem Cell Self-Renewal and Differentiation	\$631,831
RS1-00163-1	Bredesen, Dr. Dale Eric	Buck Institute for Age Research	Programmed Cell Death Pathways Activated in Embryonic Stem Cells	\$734,202
RS1-00169-1	Cashman, Dr. John R.	Human BioMolecular Research Institute	Discovering Potent Molecules with Human ESCs to Treat Heart Disease	\$714,654
RS1-00170-1	Chen, Dr. Bin	University of California, Santa Cruz	In vitro differentiation of hESCs into corticospinal motor neurons	\$500,000
RS1-00171-1	Chen, Dr. Huei-Sheng Vincent	Burnham Institute for Medical Research	Development of Neuro-Coupled Human Embryonic Stem Cell-Derived Cardiac Pacemaker Cells.	\$744,639
RS1-00172-1	Chen, Dr. Irvin S.Y.	University of California, Los Angeles	Genetic modification of the human genome to resist HIV-1 infection and/or disease progression	\$642,652
RS1-00173-1	Chien, Professor Shu	University of California, San Diego	Combinatorial Platform for Optimizing Microenvironments to Control hESC Fate	\$638,140
RS1-00174-1	Choe, Dr. Senyon	The Salk Institute for Biological Studies	A method to maintain and propagate pluripotent human ES cells	\$796,348
RS1-00183-1	Cooke, Dr. John P	Stanford University	EC regeneration in cerebrovascular ischemia: role of NO	\$658,125
RS1-00193-1	Duester, Dr. Gregg	Burnham Institute for Medical Research	Retinoic Acid-FGF Antagonism during Motor Neuron Differentiation of Human ES Cells	\$759,000
RS1-00195-1	Emerson, Dr. Beverly M.	The Salk Institute for Biological Studies	Regulation of Specific Chromosomal Boundary Elements by CTCF Protein Complexes in Human Embryonic Stem Cells	\$678,788
RS1-00198-1	Evans, Professor Sylvia M.	University of California, San Diego	Specification of Ventricular Myocyte and Pacemaker Lineages Utilizing Human Embryonic Stem Cells	\$609,999
RS1-00199-1	Feldheim, Dr. David	University of California, Santa Cruz	Assessing the role of Eph/ephrin signaling in hESC growth and differentiation	\$499,999
RS1-00200-1	Freeze, Dr. Hudson H.	Burnham Institute for Medical Research	Role of Glycans in Human Embryonic Stem Cell Conversion to Neural Precursor Cells	\$759,000
RS1-00203-1	Galic, Dr. Zoran	University of California, Los Angeles	Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells	\$642,501
RS1-00205-1	Ghosh, Dr. Anirvan	University of California, San Diego	Generation of forebrain neurons from human embryonic stem cells	\$612,075
RS1-00207-1	Giudice, Dr. Linda C.	University of California, San Francisco	Human Embryonic Stem Cell Differentiation to Trophoblast: Basic Biology and Clinical Translation to Improve Human Fertility	\$640,399
RS1-00210-1	Greene, Dr. Warner C.	The J. David Gladstone Institutes	The APOBEC3 Gene Family as Guardians of Genome Stability in Human Embryonic Stem Cells	\$777,467

RS1-00215-1	Guo, Dr. Su	University of California, San Francisco	Identifying small molecules that stimulate the differentiation of hESCs into dopamine-producing neurons	\$564,309
RS1-00222-1	Hinton, Dr. David R	University of Southern California	Therapeutic potential of Retinal Pigment Epithelial cell lines derived from hES cells for retinal degeneration.	\$684,322
RS1-00225-1	Huang, Dr. Ziwei	Burnham Institute for Medical Research	New Chemokine-Derived Therapeutics Targeting Stem Cell Migration	\$759,000
RS1-00228-1	Jamieson, Dr. Catriona	University of California, San Diego	Derivation and Characterization of Cancer Stem Cells from Human ES Cells	\$642,500
RS1-00236-1	Kay, Dr. Mark A	Stanford University	Novel vectors for gene transfer into human ES cells	\$640,642
RS1-00239-1	Khine, Dr. Michelle	University of California, Merced	Micro Platform for Controlled Cardiac Myocyte Differentiation	\$363,707
RS1-00242-1	Kovacs, Professor Gregory T. A.	Stanford University	Technology for hESC-Derived Cardiomyocyte Differentiation and Optimization of Graft-Host Integration in Adult Myocardium	\$634,287
RS1-00243-1	Kuo, Dr. Calvin Jay	Stanford University	Differentiation of Human Embryonic Stem Cells to Intestinal Fates	\$578,943
RS1-00245-1	Kurdistani, Dr. Siavash K	University of California, Los Angeles	Cellular epigenetic diversity as a blueprint for defining the identity and functional potential of human embryonic stem cells	\$641,047
RS1-00249-1	Lawlor, Dr. Elizabeth R	Children's Hospital of Los Angeles	hESC as tools to investigate the neural crest origin of Ewing's sarcoma	\$675,001
RS1-00259-1	Lowry, Dr. William E	University of California, Los Angeles	Modeling Human Embryonic Development with Human Embryonic Stem Cells	\$571,575
RS1-00262-1	Lu, Dr. Wange	University of Southern California	Regulation of human neural progenitor cell proliferation by Ryk-mediated Wnt signaling	\$668,987
RS1-00271-1	McConnell, Professor Susan K	Stanford University	Optimization of guidance response in human embryonic stem cell derived midbrain dopaminergic neurons in development and disease	\$633,170
RS1-00280-1	Murre, Professor Cornelis	University of California, San Diego	Generation of long-term cultures of human hematopoietic multipotent progenitors from embryonic stem cells	\$538,211
RS1-00283-1	Oshima, Dr. Robert G.	Burnham Institute for Medical Research	Trophoblast differentiation of human ES cells.	\$748,240
RS1-00288-1	Pfaff, Dr. Samuel L.	The Salk Institute for Biological Studies	Gene regulatory mechanisms that control spinal neuron differentiation from hES cells.	\$807,749
RS1-00289-1	Pirrung, Professor Michael C	University of California, Riverside	Stem Cell Survival and Differentiation Through Chemical Genetics	\$543,987
RS1-00292-1	Ren, Bing	Ludwig Institute for Cancer Research	Mapping the transcriptional regulatory elements in the genome of hESC	\$691,489

RS1-00295-1	Robey, Professor Ellen A	University of California, Berkeley	In Vitro Differentiation of T cells from Human Embryonic Stem Cells.	\$499,999
RS1-00298-1	Sage, Julien	Stanford University	Functions of RB family proteins in human embryonic stem cells	\$520,777
RS1-00302-1	Schultz, Professor Peter G	Scripps Research Institute	A Chemical Approach to Stem Cell Biology	\$784,900
RS1-00305-1	Smotrich, Dr. David	Burnham Institute for Medical Research	Generation of hESC lines, under defined conditions, modeling normal & diseased states from material stored at the Burnham shared embryo bank.	\$638,000
RS1-00313-1	Teitell, Dr. Michael Alan	University of California, Los Angeles	Role of Mitochondria in Self-Renewal Versus Differentiation of Human Embryonic Stem Cells	\$635,024
RS1-00317-1	Verdin, Dr. Eric M.	The J. David Gladstone Institutes	Role of HDAC in human stem cells pluripotentiality and differentiation	\$790,999
RS1-00319-1	Wandless, Professor Thomas J.	Stanford University	Reprogramming Differentiated Human Cells to a Pluripotent State	\$647,681
RS1-00321-1	Weinberg, Dr. Kenneth I	Stanford University	Embryonic stem cell-derived thymic epithelial cells	\$658,057
RS1-00322-1	Wu, Joseph C	Stanford University	In Vivo Imaging of Human Embryonic Stem Cell Derivatives and Tumorigenicity	\$658,123
RS1-00323-1	Wysocka, Professor Joanna	Stanford University	Role of Chromatin Modifiers in Regulating Human Embryonic Stem Cell Pluripotency	\$658,126
RS1-00326-1	Yang, Dr. Phillip Chung-Ming	Stanford University	In Vivo Molecular Magnetic Resonance Imaging of Human Embryonic Stem Cells in Murine Model of Myocardial Infarction	\$658,125
RS1-00327-1	Ying, Dr. Qilong	University of Southern California	Self-renewal of human embryonic stem cells	\$663,209
RS1-00331-1	Zhang, Dr. Zhuohua	Burnham Institute for Medical Research	Modeling Parkinson's Disease Using Human Embryonic Stem Cells	\$758,999
RS1-00333-1	Zheng, Dr. Binhai	University of California, San Diego	Genetic manipulation of human embryonic stem cells and its application in studying CNS development and repair	\$642,361
RS1-00365-1	Bertozzi, Professor Carolyn Ruth	University of California, Berkeley	Profiling surface glycans and glycoprotein expression of human embryonic stem cells	\$498,409
RS1-00377-1	Cummings, Dr. Brian John	University of California, Irvine	The Immunological Niche: Effect of immunosuppressant drugs on stem cell proliferation, gene expression, and differentiation in a model of spinal cord injury.	\$619,223
RS1-00381-1	Daldrup-Link, Dr. Heike E.	University of California, San Francisco	Labeling of human embryonic stem cells with iron oxide nanoparticles and fluorescent dyes for a non-invasive cell depiction with MR imaging and optical imaging	\$251,088
RS1-00402-1	Kasahara, Dr. Noriyuki	University of California, Los Angeles	Down-Regulation of Alloreactive Immune Responses to hES Cell-Derived Graft Tissues	\$469,219

RS1-00404-1	Kim, Dr. Seung K.	Stanford University	Patient-specific cells with nuclear transfer	\$656,074
RS1-00408-1	Laird, Professor Peter William	University of Southern California	Screening for Oncogenic Epigenetic Alterations in Human ES Cells	\$685,000
RS1-00409-1	Lane, Dr. Thomas Edward	University of California, Irvine	Human Embryonic Stem Cells and Remyelination in a Viral Model of Demyelination	\$425,594
RS1-00413-1	Limoli, Professor Charles L.	University of California, Irvine	Using human embryonic stem cells to treat radiation-induced stem cell loss: Benefits vs cancer risk	\$625,617
RS1-00416-1	MacGregor, Dr. Grant R	University of California, Irvine	Production of Oocytes from Human ES Cells	\$623,781
RS1-00420-1	Mikkola, Dr. Hanna	University of California, Los Angeles	Improving microenvironments to promote hematopoietic stem cell development from human embryonic stem cells	\$577,037
RS1-00428-1	O'Connor, Dr. Timothy R.	City of Hope National Medical Center	Sources of Genetic Instability in Human Embryonic Stem Cells.	\$357,978
RS1-00432-1	Procaccio, Dr. Vincent	University of California, Irvine	Mitochondrial Dysfunction in Embryonic Stem Cells	\$632,500
RS1-00434-1	Ramalho-Santos, Miguel	University of California, San Francisco	Transcriptional Regulation of Human Embryonic Stem Cells	\$618,901
RS1-00444-1	Tlsty, Dr. Thea D.	University of California, San Francisco	Role of the tumor suppressor gene, p16INK4a, in regulating stem cell phenotypes in embryonic stem cells and human epithelial cells.	\$639,150
RS1-00449-1	Weaver, Dr. Valerie Marie	University of California, San Francisco	Force, Dimensionality and Stem Cell Fate	\$561,082
RS1-00452-1	Willenbring, Dr. Holger	University of California, San Francisco	Induction of pluripotency in fibroblasts by fusion with enucleated human embryonic stem cell syncytia	\$342,962
RS1-00453-1	Yamoah, Ebenezer N.	University of California, Davis	Hair Cells and Spiral Ganglion Neuron Differentiation from Human Embryonic Stem Cells	\$469,327
RS1-00455-1	Yokomori, Kyoko	University of California, Irvine	Derivation and characterization of human ES cells from FSHD embryos	\$632,500
RS1-00462-1	Gao, Dr. Fen-Biao	The J. David Gladstone Institutes	MicroRNAs in Human Stem Cell Differentiation and Mental Disorders	\$791,000
RS1-00464-1	Reddi, Professor Hari A	University of California, Davis	hESCs for Articular Cartilage Regeneration	\$367,650
RS1-00466-1	Terskikh, Dr. Alexey	Burnham Institute for Medical Research	Analysis of Candidate Neural Crest Cells Derived from Human ES Cells	\$759,000
RS1-00477-1	Sauer, Dr. Frank Uwe	University of California, Riverside	Non-coding RNA as tool for the active control of stem cell differentiation	\$595,469

Total \$44,839,926

About CIRM

Governed by the ICOC, the CIRM was established in 2004 with the passage of Proposition 71, the California Stem Cell Research and Cures Initiative. The statewide

ballot measure, which provided \$3 billion in funding for stem cell research at California universities and research institutions, was approved by California voters, and called for the establishment of an entity to make grants and provide loans for stem cell research, research facilities, and other vital research opportunities. The CIRM is the largest source of funding for human embryonic stem cell research in the world. For more information, please visit www.cirm.ca.gov.

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