

Solid Tumor Fact Sheet

CIRM funds many projects seeking to better understand solid tumors and to translate those discoveries into new therapies.

Description

Solid tumors include cancers of the brain, ovary, breast, colon and other tissues. Many people believe that one quality solid tumors share is a reliance on cancer stem cells. These cancer stem cells are thought to divide to produce the bulk of the cells that make up the tumor.

The hypothesis suggests that unlike most cells of a tumor, the cancer stem cells divide very slowly and are less likely to be destroyed by chemotherapies that kill the fast-growing tumor cells. The thought is that cancers might recur because the chemotherapy kills the bulk of the tumor, but leaves behind the cancer stem cells that can, over time, form a new tumor.

Stem cell scientists are studying cancer stem cells from solid tumors in the lab to find ways of destroying them. If these cancer stem cells share characteristics that allow them to be destroyed by the same drug, then a single new drug could significantly improve cancer treatment for a range of different cancer types.

Clinical Stage Programs

Stanford University

The Stanford University team has found a protein on the surface of leukemia stem cells that protects those cells from elimination by the patient's own immune system. They call this protein a "don't eat me" signal. They will create an antibody therapy that blocks that protein and makes the cancer stem cell available to be attacked and destroyed by the immune system.

- [Read a summary of this project](#)

Forty Seven Inc.

This company is using the same antibody therapy as in the Stanford trial, this time to fight colorectal or bowel cancer. They are combining their antibody therapy with another antibody-based cancer drug called Cetuximab in hopes of treating patients with colorectal cancer.

- [Read a summary of this project](#)

University of California, Los Angeles

A team led by scientists at UCLA has identified several potential drugs that kill cancer stem cells from the ovary, colon and brain in the lab dish. They will continue studying these drugs to find one that is most likely to be safe and effective at destroying cancer stem cells in people. Once they've identified the best candidate drug, the team plans to start clinical trials.

- [Read a summary of this project](#)

Participant in UCLA clinical trial talks about his cancer diagnosis and his clinical trial experience

CIRM Grants Targeting Solid Tumors

















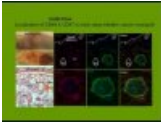




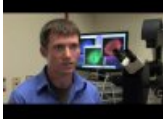

Researcher name	Institution	Grant Title	Grant Type	Award Amount
Christine Brown	City of Hope, Beckman Research Institute	Phase I Study of Chimeric Antigen Receptor Engineered Central Memory T cells for the Treatment of Malignant Glioma	Clinical Trial Stage Projects	\$12,753,854
Dennis Slamon	University of California, Los Angeles	Therapeutic Opportunities To Target Tumor Initiating Cells in Solid Tumors	Disease Team Research I	\$19,979,660
Robert Reiter	University of California, Los Angeles	Clinical Development of an N-cadherin Antibody to Target Cancer Stem Cells	Early Translational IV	\$4,075,668
Mark Walters	Children's Hospital of Oakland Research Institute	University of California, San Francisco (UCSF) CIRM Alpha Stem Cell Clinic	Alpha Stem Cell Clinics Network Expansion	\$7,999,999
Irving Weissman	Stanford University	Development of Therapeutic Antibodies Targeting Human Acute Myeloid Leukemia Stem Cells	Disease Team Research I	\$18,759,276
Irving Weissman	Stanford University	Clinical Investigation of a Humanized Anti-CD47 Antibody in Targeting Cancer Stem Cells in Hematologic Malignancies and Solid Tumors	Disease Team Therapy Development III	\$6,505,568
John Cashman	Human BioMolecular Research Institute	Human Pancreatic Cancer Stem Cells: Developing a Novel Drug for Cancer Eradication	Inception - Discovery Stage Research Projects	\$303,894
Mitchel Berger	University of California, San Francisco	Stem Cell-Mediated Oncocidal Gene Therapy of Glioblastoma (GBM)	Disease Team Research I	\$6,214,914
Dennis Slamon	University of California, Los Angeles	A Phase I dose escalation and expansion clinical trial of the novel first-in-class Polo-like Kinase 4 (PLK4) inhibitor, CFI-400945 in patients with advanced solid tumors	Disease Team Therapy Development III	\$5,683,693

Julia Unternaehrer-Hamm	Loma Linda University	Targeting cancer stem cells with nanoparticle RNAi delivery to prevent recurrence and metastasis of ovarian cancer	Inception - Discovery Stage Research Projects	\$172,870
Zack Jerome	University of California, Los Angeles	Generation of clinical grade human iPS cells	New Cell Lines	\$1,341,000
David Cheresh	University of California, San Diego	CD61-driven stemness program in epithelial cancer	Basic Biology V	\$1,161,000
Bob Valamehr	Fate Therapeutics, Inc.	IND enabling development of FT516: A Natural Killer Cell Immunotherapy for Cancer Derived from a Human Inducible Pluripotent Stem Cell	Late Stage Preclinical Projects	\$4,000,000
Zoran Galic	University of California, Los Angeles	Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells	SEED Grant	\$616,800
Michael Barish	City of Hope, Beckman Research Institute	Genetically-modified neural stem cells for treatment of high-grade glioma	Disease Team Planning	\$55,000
Steven Dubinett	University of California, Los Angeles	A phase I trial of intratumoral administration of CCL21-gene modified dendritic cell (DC) combined with intravenous pembrolizumab for advanced NSCLC	Clinical Trial Stage Projects	\$11,815,315
Elizabeth Lawlor	Children's Hospital of Los Angeles	hESC as tools to investigate the neural crest origin of Ewing's sarcoma	SEED Grant	\$595,576
Michael Snyder	Stanford University	Center of Excellence for Stem Cell Genomics - Stanford	Genomics Centers of Excellence Awards (R)	\$22,796,609
John Zaia	City of Hope, Beckman Research Institute	Ex Vivo Gene Engineering of Blood Stem Cells for Enhanced Chemotherapy Efficacy in Glioblastoma Patients	Late Stage Preclinical Projects	\$3,684,259
Antoni Ribas	University of California, Los Angeles	Stem Cells for Immune System Regeneration to Fight Cancer	New Faculty II	\$3,072,000
Joshua Stuart	University of California, Santa Cruz	Center of Excellence for Stem Cell Genomics - UCSC	Genomics Centers of Excellence Awards (R)	\$4,000,000
Devon Shedlock	Poseida Therapeutics, Inc.	Late-Stage Preclinical Study of CAR-T Memory Stem Cells Targeting PSMA (P-PSMA-101) for the Treatment of Castrate-Resistant Metastatic Prostate Cancer	Late Stage Preclinical Projects	\$3,992,090

Brigitte Gomperts	University of California, Los Angeles	Stem Cells in Lung Cancer	New Faculty II	\$2,381,572
John Zaia	City of Hope, Beckman Research Institute	The Innovation-Alpha Clinic for Cellular Therapies (I-ACT) – A Program for the Development and Delivery of Innovative Cell-based Treatments and Cures for Life-threatening Diseases.	Alpha Stem Cell Clinics	\$8,000,000
Hideho Okada	University of California, San Francisco	Non-viral reprogramming of the endogenous TCR α locus to direct stem memory T cells against shared neoantigens in malignant gliomas	Quest - Discovery Stage Research Projects	\$900,000
Siavash Kurdistani	University of California, Los Angeles	Epigenetics in cancer stem cell initiation and clinical outcome prediction	New Faculty I	\$3,063,450
Robert Dillman	Caladrius Biosciences	Tumor stem cell-targeted immunotherapy for metastatic melanoma –a randomized phase 3 clinical trial.	Clinical Trial Stage Projects	\$3,000,000
Saul Priceman	City of Hope, Beckman Research Institute	Chimeric Antigen Receptor-Engineered Stem/Memory T Cells for the Treatment of Recurrent Ovarian Cancer	Quest - Discovery Stage Research Projects	\$1,381,104
Robert Wechsler-Reya	Sanford-Burnham Medical Research Institute	The role of neural stem cells in cerebellar development, regeneration and tumorigenesis	Research Leadership	\$5,226,049
Anthony Gringeri	ImmunoCellular Therapeutics	A Phase III randomized double-blind, controlled study of ICT 107 with maintenance temozolomide (TMZ) in newly diagnosed glioblastoma following resection and concomitant TMZ chemoradiotherapy	Clinical Trial Stage Projects	\$5,391,016
Philip Beachy	Stanford University	Pluripotent stem cell-derived bladder epithelial progenitors for definitive cell replacement therapy of bladder cancer	Quest - Discovery Stage Research Projects	\$1,265,436
Antoni Ribas	University of California, Los Angeles	Genetic Re-programming of Stem Cells to Fight Cancer	Disease Team Therapy Planning I	\$97,785
Albert Wong	Stanford University	2nd Generation Vaccine for the Treatment of Glioblastoma	Therapeutic Translational Research Projects	\$2,929,889
Albert Wong	Stanford University	Recombinant Bispecific Antibody Targeting Cancer Stem Cells for the Therapy of Glioblastoma	Disease Team Therapy Planning I	\$109,750

Owen Witte	University of California, Los Angeles	Identification of stem cell surface markers as potential therapeutic targets for advanced prostate cancer	Inception - Discovery Stage Research Projects	\$209,160	
Stephen Forman	City of Hope, Beckman Research Institute	Targeting glioma cancer stem cells with receptor-engineered self-renewing memory T cells	Early Translational III	\$5,215,447	
Hiroimitsu Nakauchi	Stanford University	Novel Rejuvenated T Cell Immunotherapy for Lung Cancer	Quest - Discovery Stage Research Projects	\$1,968,456	
Antoni Ribas	University of California, Los Angeles	Genetic Re-programming of Stem Cells to Fight Cancer	Disease Team Therapy Development - Research	\$19,875,776	
Mark Chao	Forty Seven Inc.	A Phase 1b/2 Trial of the Anti-CD47 Antibody Hu5F9-G4 in Combination with Cetuximab in Patients with Solid Tumors and Advanced Colorectal Cancer	Clinical Trial Stage Projects	\$10,234,048	
Dan Kaufman	University of California, San Diego	Targeted off-the-shelf immunotherapy to treat refractory cancers	Quest - Discovery Stage Research Projects	\$1,936,936	
Noriyuki Kasahara	University of California, Los Angeles	Stem cell-based carriers for RCR vector delivery to glioblastoma	Early Translational II	\$3,340,625	
Owen Witte	University of California, Los Angeles	Trop2 dependent and independent mechanisms of self-renewal in human cancer stem cells	Basic Biology IV	\$1,254,960	
Yuan Chen	City of Hope, Beckman Research Institute	A Novel Approach to Eradicate Cancer Stem Cells	Quest - Discovery Stage Research Projects	\$1,839,484	
Karen Aboody	City of Hope, Beckman Research Institute	Stem Cell-mediated Therapy for High-grade Glioma: Toward Phase I-II Clinical Trials	Disease Team Research I	\$17,890,623	
Michelle Monje	Stanford University	White matter neuroregeneration after chemotherapy: stem cell therapy for "chemobrain"	New Faculty Physician Scientist	\$2,800,536	
					Total: \$239,891,147.00

CIRM Cancer Stem Cell Videos

 <p>Patient's Stage IV Cancer Vanishes during CIRM-Funded Clinical Trial</p>	 <p>CURED: Stem Cell Clinical Trial Stories</p>	 <p>UCLA Clinical Trial Targets Cancer Stem Cells: A Patient's Story</p>	 <p>Role of Stem Cells on Cognitive Dysfunction after Cancer Therapy</p>
 <p>Stem Cell Therapies for Leukemia: Marching Toward the Clinic</p>	 <p>Andrew Goldstein, UCLA - CIRM Stem Cell #SciencePitch</p>	 <p>Michael Rothenberg, Stanford - CIRM Stem Cell #SciencePitch</p>	 <p>Anica Sayoc, City of Hope - CIRM Stem Cell #SciencePitch</p>
 <p>Catriona Jamieson, UCSD - CIRM Stem Cell #SciencePitch</p>	 <p>Paul Knoepfler, UC Davis - CIRM Stem Cell #SciencePitch</p>	 <p>Amy Spowles, Humboldt State University - CIRM Stem Cell #SciencePitch</p>	 <p>Yi Eve Sun, UCLA - CIRM Stem Cell #SciencePitch 2</p>
 <p>Irving Weissman, Stanford - CIRM Stem Cell #SciencePitch</p>	 <p>Brain Tumors: Advancing Stem Cell Therapies - 2011 CIRM Grantee Meeting</p>	 <p>Leukemia: Advancing Stem Cell Therapies - 2011 CIRM Grantee Meeting</p>	 <p>Spotlight on Cancer Stem Cells</p>
 <p>Spotlight on Basic Research: Irv Weissman</p>	 <p>Spotlight on Leukemia: Welcoming Remarks</p>	 <p>Spotlight on Leukemia: Catriona Jamieson, M.D.</p>	 <p>Spotlight on Leukemia: Clinical Trial Participants</p>
 <p>Progress and Promise in Leukemia</p>	 <p>Genetic Molecule Enables Safer Method For Creating iPS Cells</p>	 <p>Catriona Jamieson Talks About Therapies Based on Cancer Stem Cells</p>	

News about solid tumor research

- Bad Seeds: Cancer's Ultimate Source (Stanford Medicine)
- The True Seeds of Cancer (Stanford Medicine)
- CIRMResearch Blog entries about cancer stem cell research

Resources

- NIH: Cancer Information Service
- National Cancer Institute
- American Cancer Society
- Stem Cell Network solid tumor page
- Ovarian Cancer National Alliance
- American Association for Cancer Research
- Family Caregiver Alliance
- National Family Caregivers Association

Find Out More:

[Stem Cell FAQ](#) | [Stem Cell Videos](#) | [What We Fund](#)

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