CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

The state stem cell agency

President's Report

Alan O. Trounson

ICOC Meeting – April 2010

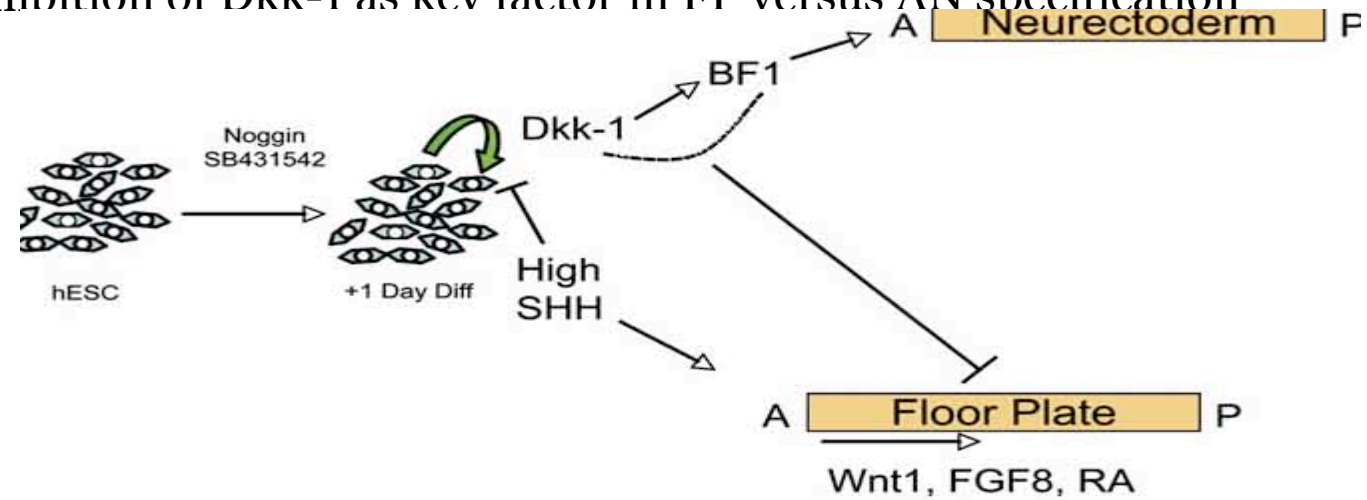
Agenda Item #5

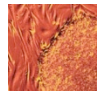
Efficient derivation of functional floor plate tissue from human embryonic stem cells.

Fasano CA, Chambers SM, Lee G, Tomishima MJ, Studer L , Sloan Kettering NY

Cell Stem Cell. 2010 Apr 2;6(4):336-47

- The floor plate (FP) is a critical signaling center during neural development located along the ventral midline of the embryo.
- Little is known about human FP development because of the lack of tissue accessibility. In the mouse the FP is a source of midbrain dopamine neurones
- FP induction in hESCs is dependent on early SHH exposure and occurs at the expense of anterior neurectoderm (AN).
- Global gene expression and functional studies identify SHH-mediated inhibition of Dkk-1 as key factor in FP versus AN specification

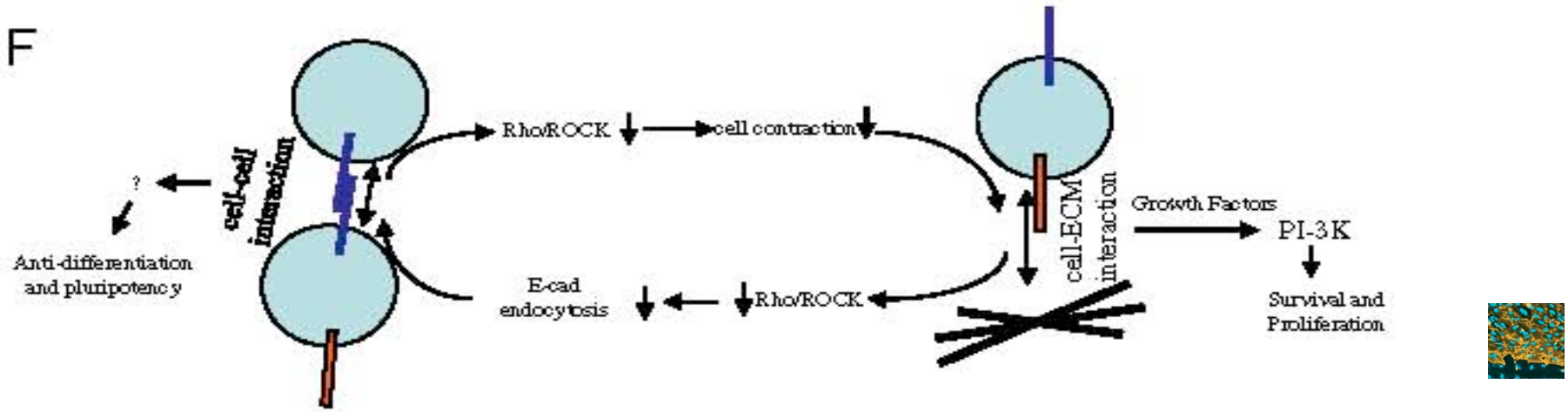




Revealing a core signaling regulator mechanism for pluripotent stem cell survival and self-renewal by small molecules.

Xu et al., Sheng Ding's Lab, Scripps Res. Institute *PNAS* April 20 2010

- High throughput chemical screening identified two small molecules that enhance the survival of hESCs in culture
- Showed the molecules action revealed the essential role of the cell adhesion molecule – E-cadherin signaling in maintaining hESCs
- Enzymatic digestion of hESCs disrupts E-cadherin signaling and this perturbs intergrin signaling
- The two cell adhesion signaling systems cooperate with growth factor signaling to control survival and self renewal of hESCs

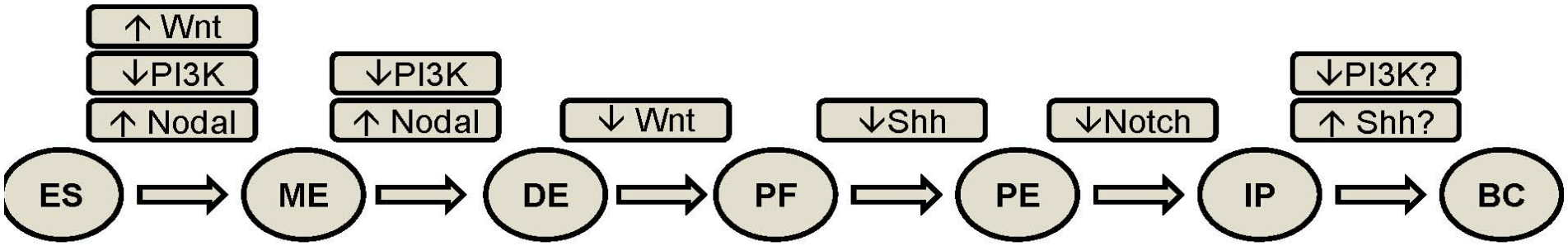


Generating pancreatic β-cells from embryonic stem cells by manipulating signaling pathways.

SC Tsaniras & PM Moss. Kings College London, *J Endocrinology* April 12 2010

- Insulin producing cells can be produced by mimicking the in vivo developmental pathways in which cells transition through mesendoderm, definitive endoderm, foregut endoderm, pancreatic endoderm and the endocrine precursor stage
- By focusing on the intracelluar signaling pathways, it is possible to construct a logical sequence that enables the variety of growth factor methods to become comprehensible
- The critical signaling pathways they operate through are:

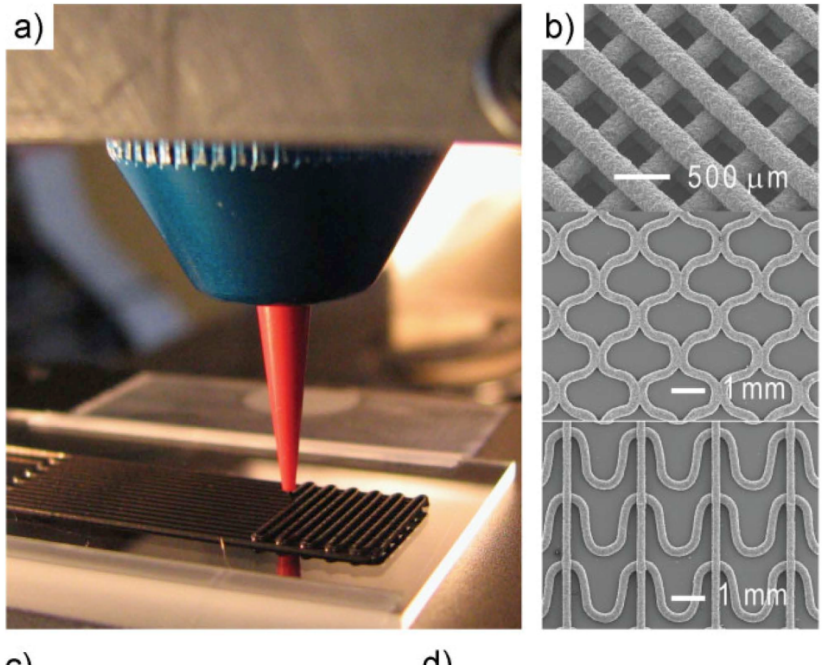
  P13K, TGF-β, Wnt/β-catenin, Hedgehog, and Notch



Printed Origami Structures

Ahn et al., Uni Illinois, Urbana. *Advanced Materials* 22: 1-4. 2010

- Merged direct-write assembly with a wet-folding origami technique
- Direct ink printing provides an attractive, non-lithographic approach for meeting demanding design rules
- Facile pathway for assembling metallic, ceramic and polymeric ink materials in myriad shapes
- 3D mesoscale objects may find potential applications as tissue engineered scaffolds, biomedical devices, or catalyst supports



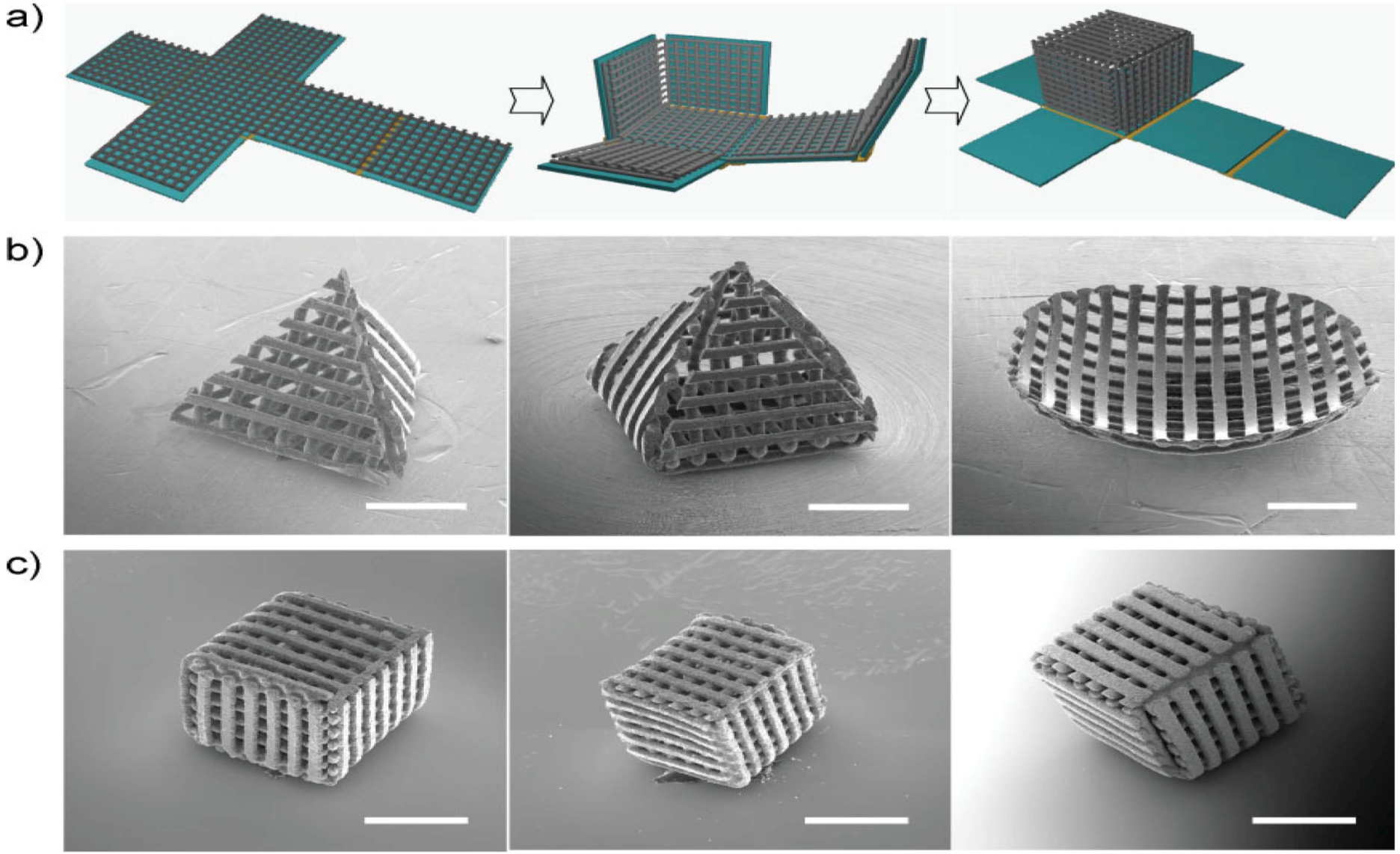


Figure 2. a) Schematic illustration of folding procedure for an origami cube. b) SEM images of a printed origami TiH_2 tetrahedron (left) and square pyramid (middle) as well as a printed and molded TiH_2 hemisphere (right). c) SEM images of a printed origami cube before (left, TiH_2) and after annealing in a vacuum (middle, Ti) or air (right, TiO_2) at 1050 °C. Scale bar = 2 mm.

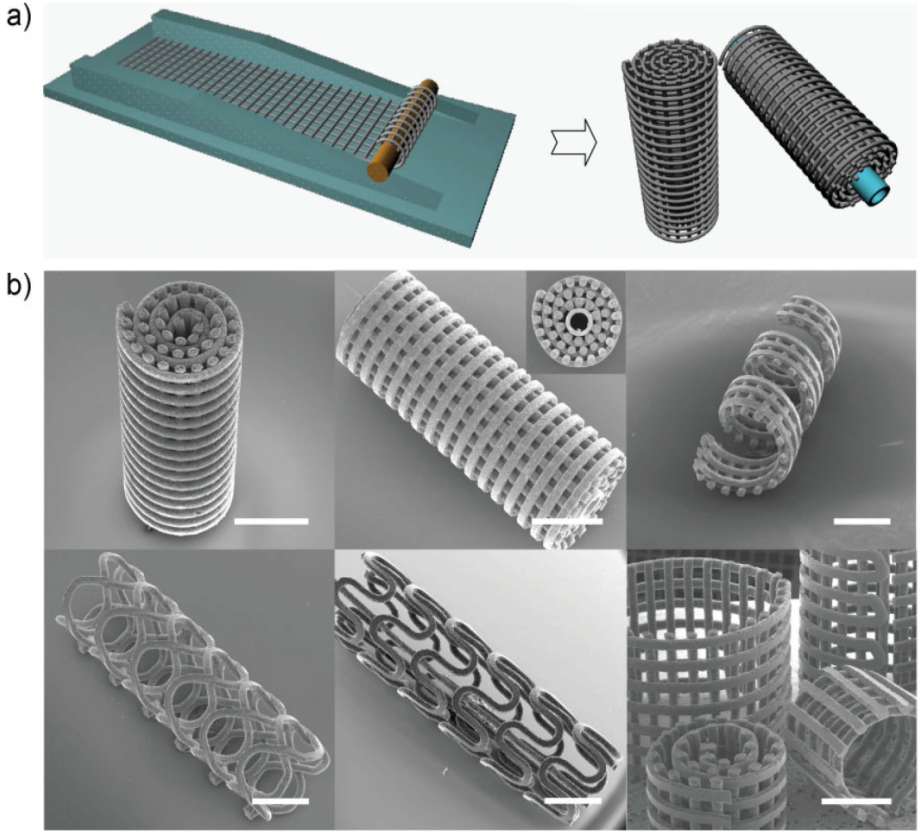


Figure 3. a) Schematic illustration of rolling procedure for high aspect ratio, cylindrical coils. b) SEM images of concentric cylindrical TiH_2 coils without and with a titanium tubular insert (top left and middle), helix (top right), stents (bottom left and right), and square latticed hollow cylinders (bottom right). Scale bar = 2 mm.

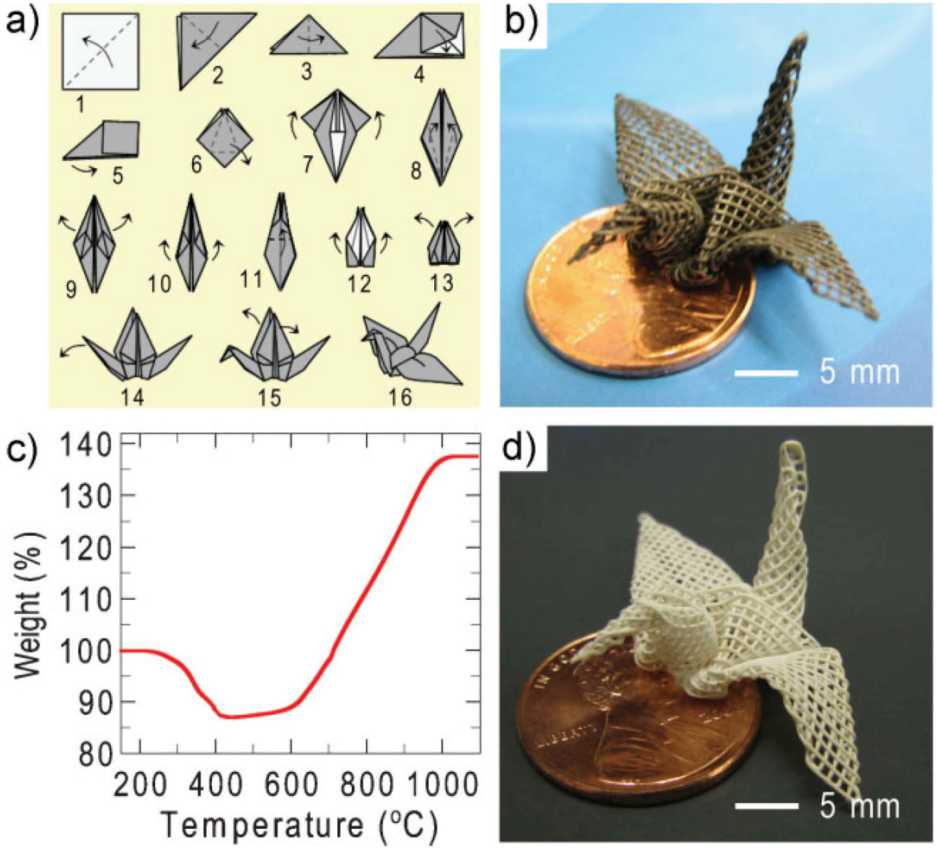
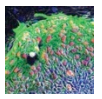
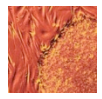
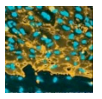


Figure 4. a) Schematic illustration of folding sequence for an origami crane. b) Optical image of printed origami TiH_2 crane. c) Thermogravimetric analysis of a dried ink filament. d) Optical image of a TiO_2 crane produced by annealing a printed origami TiH_2 crane at 1050 °C in air.

President's Priorities

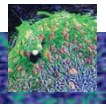
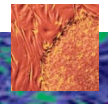
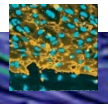
- Immunology Review
- Issues for resolution for DT preclinical research, team agreements and milestones
- VP R&D Search
- Financial Forecasting for Timing RFA Release
- ISSCR/CIRM Regulatory Workshop
- FDA Webinar
- SCNT Workshop
- CIRM 2010 Review
- Communications and Collaborative Funding Agreements /Contracts
- CIRM Scientific Creativity Internships
- iPSC Banking

Personnel

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

Nini Gabra
Administrative Assistant to
General Counsel &
Vice President, Operations

External Review

- Strategic Plan called for an external review to benchmark CIRM's efforts against its goals
- Review will be submitted as a written report to be presented at December 2010 ICOC meeting

- Charge of the Review Team is:
- To evaluate CIRM's programs against its goals
- To assess their effectiveness in moving CIRM toward meeting its goals and accomplishing its mission
- To recommend changes to CIRM's funding priorities to insure that CIRM is supporting the most promising advances in the field of regenerative medicine

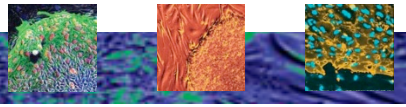
2010 CIRM External Review Team
October 13-15, 2010

- **Dr. Alan Bernstein** – Founding Exec Dir of Canadian Institutes of Health Research (ret), Director of Global HIV Vaccine Enterprise
- **Dr. George Daley** - Harvard University (stem cells)
- **Prof. Sir Martin Evans** – Nobel Laureate (stem cells), University of Cardiff, Wales
- **Prof. Judy Illes** – Neurology and Neuroethics, University of British Columbia
- **Dr. Richard Insel** – CSO, Exec VP Research JDRF
- **Dr. Rick Klausner** – The Column Group; Exec. Dir. Of Gates Foundation for Global Health & Director of the National Cancer Institute
- **Dr. Myrtle Potter** – Pres & CEO, Myrtle Potter & Company, formerly Pres. & COO of Genentech
- **Dr. Nancy Wexler** – President of the Hereditary Disease Foundation & Prof. of Neuropsychology at Columbia University

Completed Grant Reviews

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

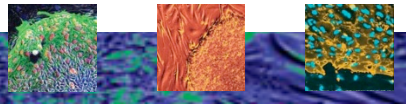
- **Stem Cell Transplantation Immunology**
  - **Review – April 8-9, 2010**
  - **ICOC – June 22-23, 2010**



Upcoming RFAs

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

- **Early Translational II**
  - Post RFA – Feb 2010
  - Receipt of pre-apps – March 18th (112 Applications)
  - Full application invite – May 17th
  - Full Grant applications – June 30th
  - Review – Sept 2010
- **Tools & Technologies for Bottlenecks**
  - Post RFA –April 2010
  - Receipt of pre-apps – May 19, 2010
  - Review – November 2010
  - ICOC – January 2011
- **Clinical Development**
  - Posting RFA – early July 2010
  - Review – January 2011
  - ICOC – March 2011



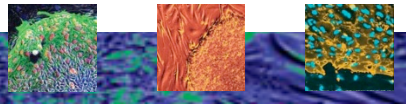
Maryland (TEDCO)/CIRM Science Collaboration

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

Baltimore, MD - March 11-12th

- Presentations by 7 California and 12 Maryland scientists from both academia and industry
- Attended by 150 scientists, clinicians and post doctoral fellows from Maryland and California
- Sessions on:

Gene Therapy Technologies
In Vivo Imaging Technologies



CIRM Consortium/FDA Webinar: Product Characterization

- **Participants from 109 U.S. & Intl. Sites**
  - mix of industry and academia
  - a large showing of FDA personnel
  - contract manufacturing organizations
- **Speakers:**
  - Dr. Donald Fink, FDA
  - Dr. Mahendra Rao, LifeTechnologies
  - Dr. Scott Burger, Advanced Cell and Gene Therapy
- **Video posted on the CIRM/RMC webpage**

  http://www.cirm.ca.gov/Webinar_4-15-10_Product_Characterization
- **Two additional educational webinars and one Roundtable before the end of 2010**

Advancing Effective Research Oversight: 2010 Regional Workshops on Regulatory Compliance

Workshops designed to support compliance with CIRM's regulatory oversight and financial reporting requirements

3 Locations: San Francisco, Los Angeles and San Diego

42 participants from CIRM grantee institutions

Workshops included:

- A review of amendments to CIRM's Medical and Ethical Standards
- A description of the CIRM Compliance Program (compliance site visits)
- Discussion of compliance issues in multi-institutional collaborations
- Discussion of financial administration issues and reporting requirements

CIRM: Geoff Lomax, Cynthia Schaffer, Gabe Thompson, Ian Sweedler, Chila Silva-Martin

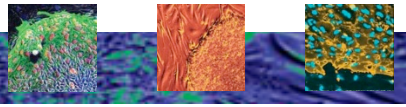
CIRM Staff Training
Advancing Research Integrity

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

Led by Dr. John Galland, Office of Research Integrity, U.S. Department of Health and Human Services

The training covered:

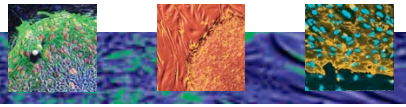
- Federal policy regarding research integrity
- Current programs to advance excellence in research practice
- Procedures, process and methods for addressing allegation of manipulation of scientific images
- The role of funding organizations, publishers and institutions in promoting good research practice



Upcoming Workshops

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

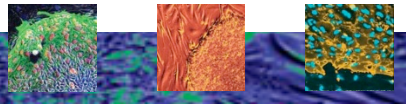
- MRC UK/CIRM - SCNT/Parthenogenesis, San Francisco - June 13-14th
- ISSCR/CIRM/Int'l Society for Cellular Therapy – Clinical Trials Regulatory Harmonization, San Francisco - June 15th
- ISSCR Annual Meeting – San Francisco - June 16-19th
- Spain/CIRM Science Collaboration - Q3
- New York/CIRM Science Collaboration – Q3
- iPSC Banking – Q3/4
- The Netherlands/CIRM Science Collaboration - Q4



Bridges Program 2010 Trainee Meeting

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

- July 8-9, 2010 in San Francisco
- Annual meeting for Bridges Trainees, Program Directors, and Trainee Mentors
- Features poster presentations by trainees, guest speakers, networking and educational sessions



CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

The state stem cell agency

2009-10 Budget Allocation and Expenditure Report

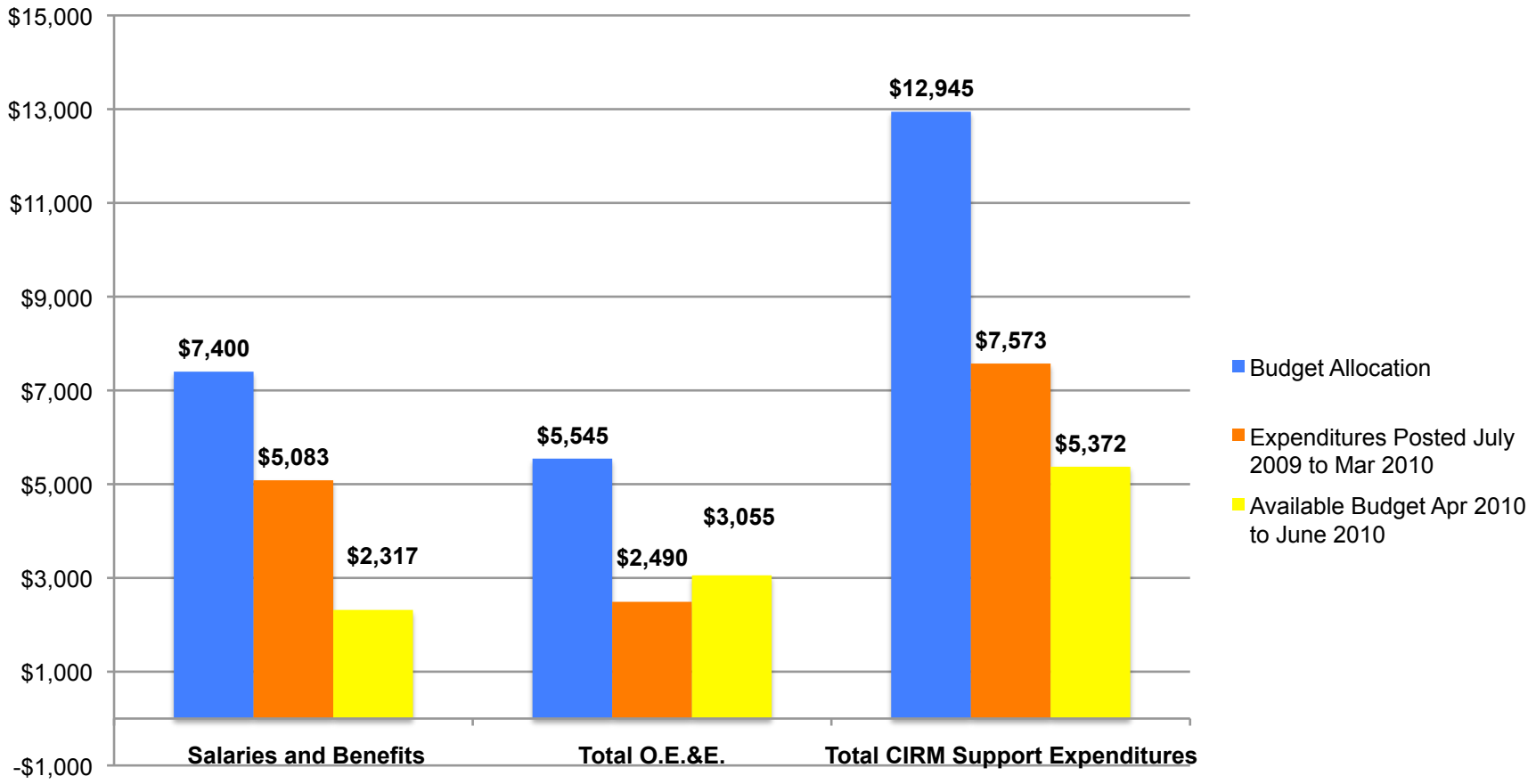
Posted Through March 31, 2010

Margaret Ferguson
Finance Officer

April 2010 ICOC Board Meeting

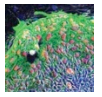
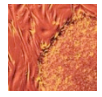
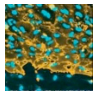
Fiscal Year 2009-10
Expenditures Posted Through March 2010

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE



Fiscal Year 2009-10

Description	Budget Allocation	Expenditures Posted 7/1/09-3/31/10	Available Budget Allocation 4/1/10-6/30/10	Percentage of Budget Allocation Posted
Personnel Services				
Salaries and Benefits	**7,400**	**5,083**	**2,317**	**69%**
Operating Expenses and Equipment				
Interagency Agreements	208	105	103	
External Contracts	2,088	1,063	1,025	
ICOC, Science, Work Group Meetings	1,329	430	899	
Other Travel	497	153	344	
Furniture and Equipment (Non-IT)	50	66	-16	
Information Technology	818	487	331	
Other O.E.&E.	556	186	370	
Total Operating Exp and Equip	**5,545**	**2,490**	**3,055**	**45%**
Total CIRM Support Expenditures	**12,945**	**7,573**	**5,372**	**59%**

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

The state stem cell agency

CIRM Finances

John Robson, PhD
VP Operations

April 2010 ICOC Board Meeting

CIRM Funding
Financial Projections to 12/31/11

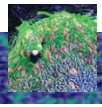
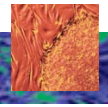
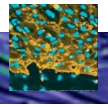
CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

Includes:

All programs approved by the ICOC

Programs with ICOC concept approval:

Basic Biology II - $30 million
Immunology - $30 million
Research Leadership Awards - $44 million
Early Translation 2 – $80 million
Clinical Development - $50 million

CIRM Funding
Financial Projections to 12/31/11

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