



TRANSFORMING *medicine
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President's Report

ICOC Meeting
December 13, 2018

Maria T. Millan, M.D.
President & CEO
California Institute for Regenerative Medicine



A young boy with dark hair is looking out a window at a lush green landscape. The boy is in the foreground, looking towards the left. The background is a blurred view of a forested hillside. The text is overlaid on the left side of the image.

CIRM's Mission

To accelerate stem cell
treatments to patients with
unmet medical needs

CIRM Investments



INFRASTRUCTURE

\$482M



EDUCATION

\$219M



DISCOVERY

\$882M



TRANSLATION

\$312M



CLINICAL

\$594M

2018 Investments

INFRASTRUCTURE

\$0M

EDUCATION

\$0.1M

DISCOVERY

\$17M

TRANSLATION

\$28M

CLINICAL

\$101M

CIRM Budget Update

January 1st 2019







Research

+



Administration

2019 Research Budget Allocation

	2019
 CLIN1&2 CLIN1&2 SCD	\$93M* \$30M
 TRAN	\$20M
 DISC	\$0M
 EDUC	\$600K

* Includes \$8M from projected returned/recovered funds
Can achieve 43-45 new clinical trials & ~43 new candidates

CIRM Strategic Plan

2016-2020



CIRM 2.0

CALIFORNIA'S STEM CELL AGENCY

2020 VISION

2016-2020 Strategic Plan

2018 Update



BUILD PIPELINE

36 New Candidates



ADVANCE PROGRAMS

Progression events up by 110%



NEW REGULATORY PARADIGM

5 Expedited FDA designations for Regenerative Medicine Advanced Therapies



ACCELERATE DEVELOPMENT

Average 17 months to IND (n=4)



EXPAND CLINICAL PORTFOLIO

Added 32 New Trials in 3 years to bring total to 49



INCREASE INDUSTRY PULL

60% CLIN programs partnered
\$1.64B Industry Investment
2018YTD: \$1.06B

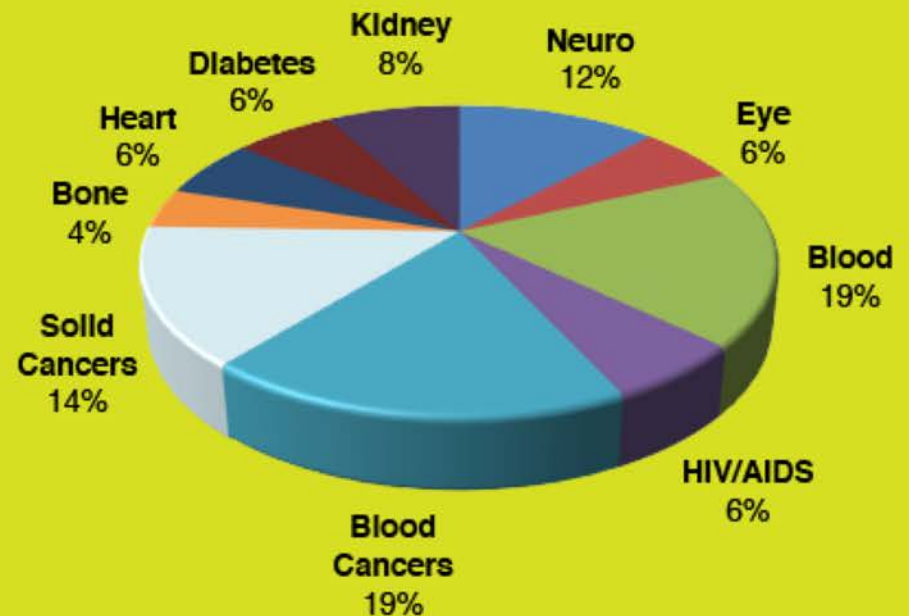
CIRM Clinical Trials

Broad Disease Indications – Unmet Medical Needs
Diverse Therapeutic Approaches

CIRM-FUNDED CLINICAL TRIALS:

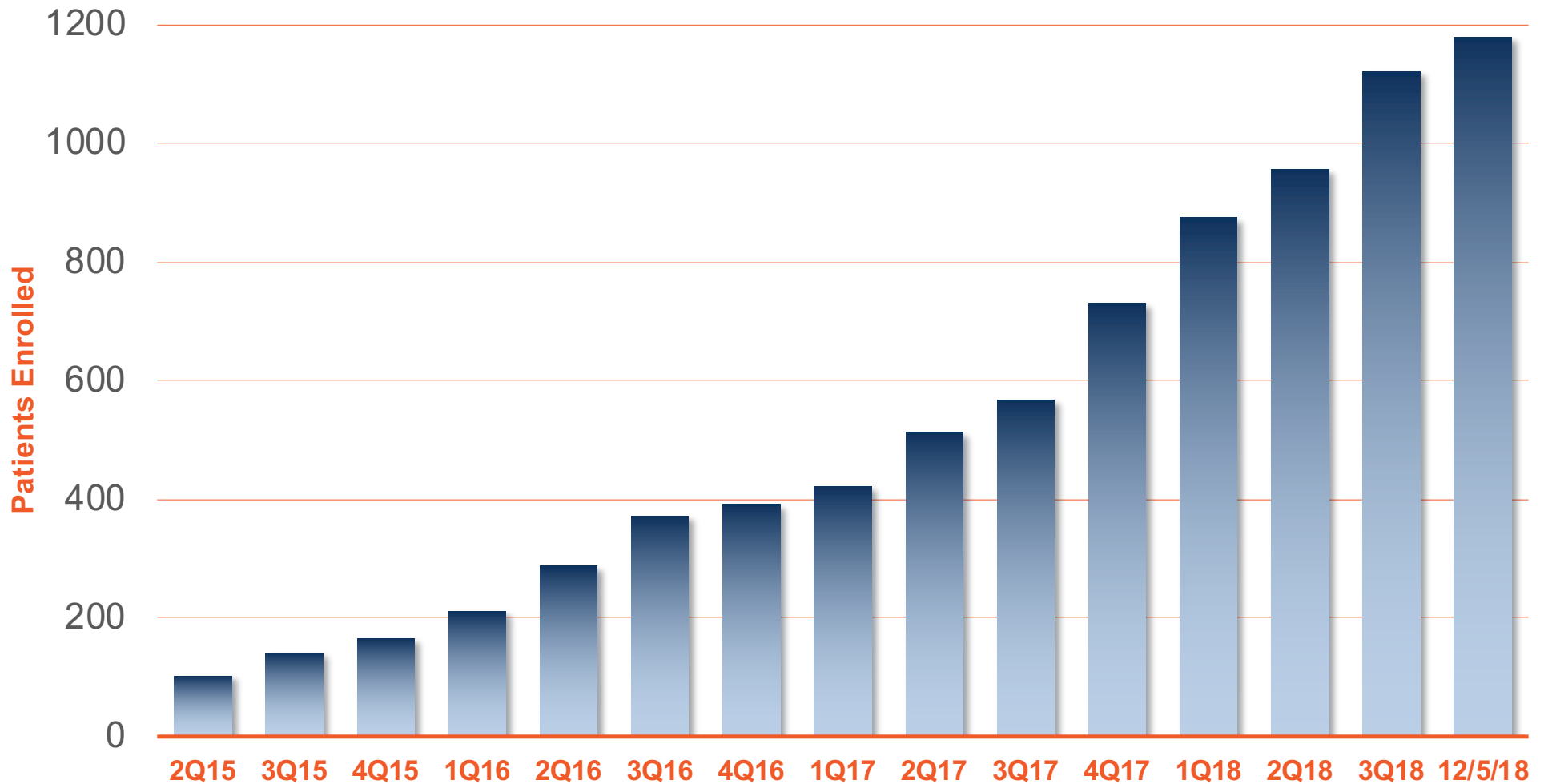


DISEASE AREAS:



CIRM CLINICAL TRIALS

ENROLLMENT DUE TO CIRM FUNDING



CIRM Program Updates

“Intel Inside”

Accelerating Clinical Development- Abba Creasey

Increasing Industry Pull- Shyam Patel

Improving Translation- Pat Olson

Communicating our Progress- Kevin McCormack



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Accelerating Clinical Development

Abla Creasey, PhD
Vice President Therapeutics & Strategic
Infrastructure
California Institute for Regenerative Medicine



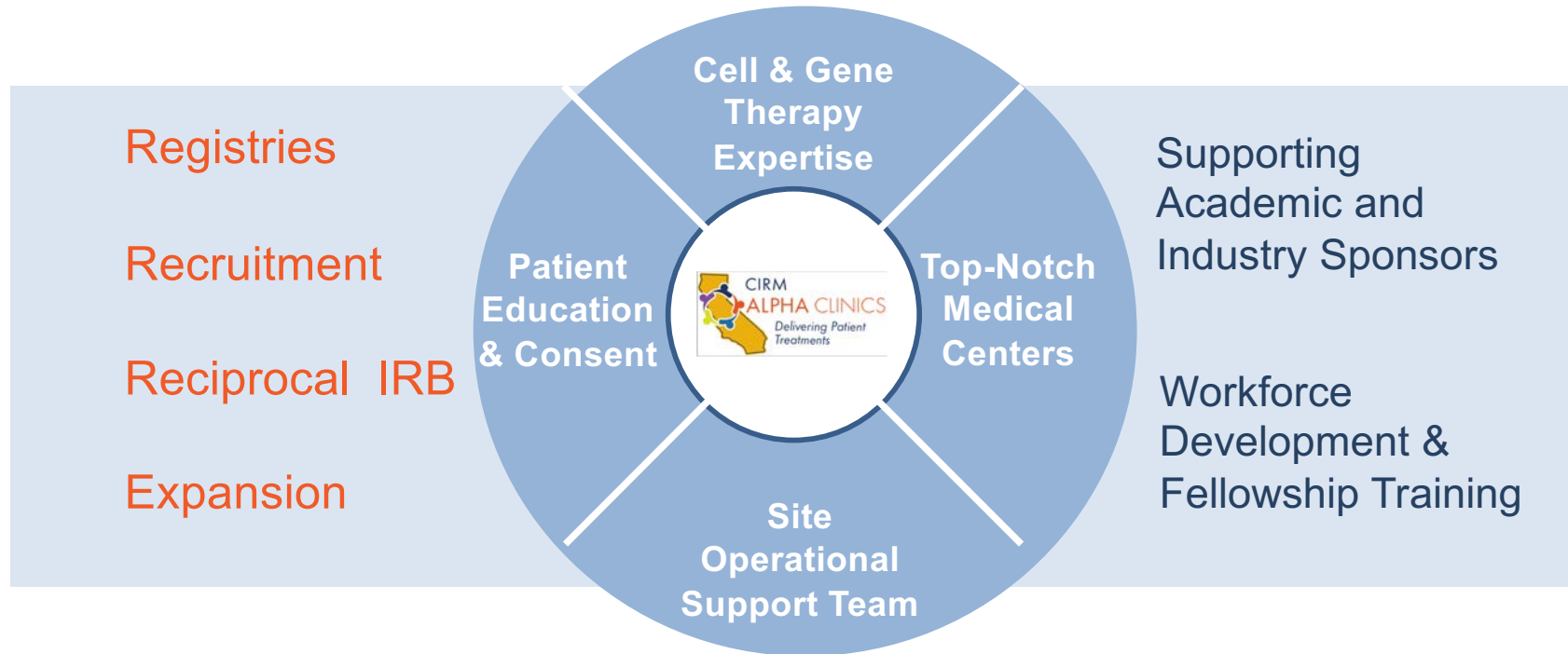
Strategic Infrastructure Updates

- Alpha Clinics Network
- CIRM Accelerating & Translating Centers – in partnership with IQVIA Cell and Gene Therapy Center
- Clinical Advisory Panel

Alpha Clinics Network

Acceleration Infrastructure

Goal: To Accelerate the Safe conduct of high quality , regulated regenerative medicine clinical trials



Alpha Clinics Network

Acceleration Infrastructure

- Rapid cohort evaluation - database of ~20 million patients
 - Multi-site trial approved in 60 days using IRB-reliance
 - Timeline to Contract- 60-90 days
 - On site facilities for product handling and/or manufacturing
 - Annual Alpha Clinics Symposium
- Every Moment Counts | Don't Stop Now

Alpha Clinics Network

Acceleration Infrastructure



70+ Clinical Trials

400+ Patients Enrolled

30+ Disease Indications

With a goal of sustainability, over \$27 million commercial clinical contracts thus far!

Alpha Clinics Network

Acceleration Infrastructure

Cell Stem Cell Forum

CIRM Alpha Stem Cell Clinics: Collaboratively Addressing Regenerative Medicine Challenges

CellPress

Catriona H.M. Jamieson,^{1,*} Maria T. Millan,² Abba A. Creasey,² Geoff Lomax,² Mary E. Donohoe,¹ Mark C. Walters,³ Mehrdad Abedi,⁴ Daniela A. Bota,⁵ John A. Zaia,⁶ and John S. Adams⁷

The California Institute for Regenerative Medicine (CIRM) Alpha Stem Cell Clinic (ASCC) Network was launched in 2015 to address a compelling unmet medical need for rigorous, FDA-regulated, stem cell-related clinical trials for patients with challenging, incurable diseases. Here, we describe our multi-center experiences addressing current and future challenges.

Accelerating and Translating Center

Goal: To support clinical development and clinical trials for regenerative medicine

99 Programs supported
\$96.4M in Contracts

Preclinical/IND enabling
Manufacturing
Clinical Trial
Clinical Development
Regulatory support
Pharmaco-economics



Planning Ahead for Patient Access

Acceleration Infrastructure

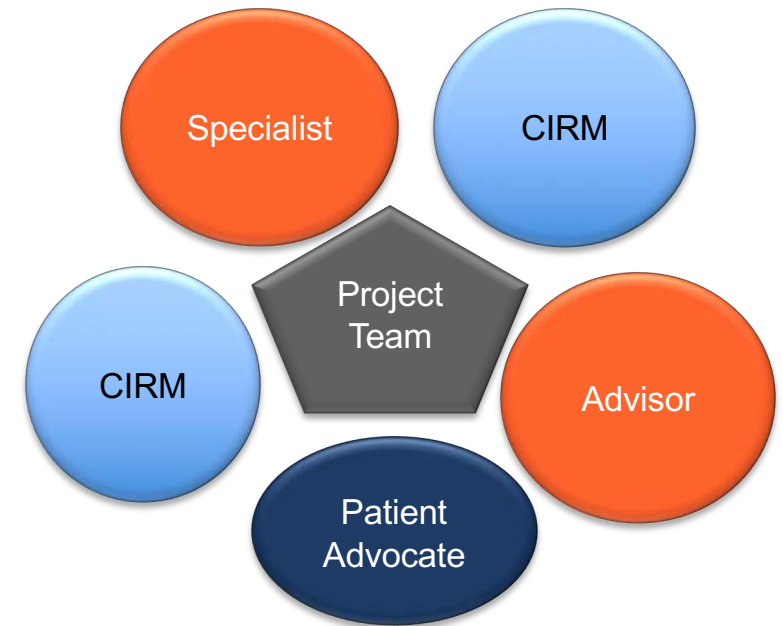
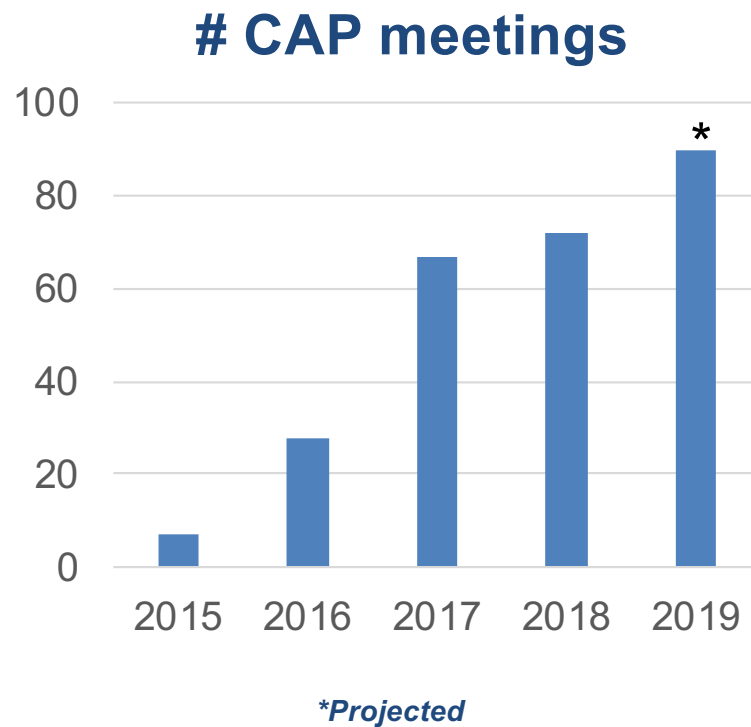


Clinical Advisory Panels

Acceleration Infrastructure

Quarterly Clinical Advisory Panel for each project

Tailored to project's needs



Clinical Advisory Panel: Case Studies

Acceleration Infrastructure

Clinical Study design & outcome:

- ✓ Interpretation of preclinical datasets
- ✓ Assistance with clinical endpoints based on up to date regulatory guidance
- ✓ Guide next phase development as data is examined with external advisors
- ✓ Address Enrollment challenges

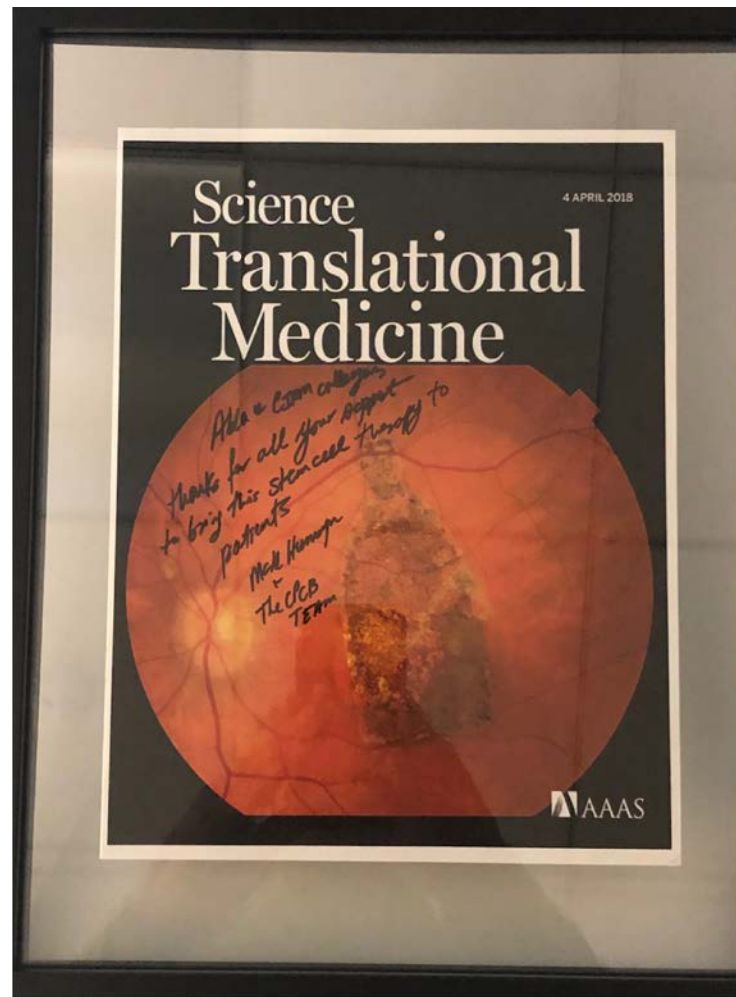
Chemistry Manufacturing Control:

- ✓ Resolution of challenges- in scale up & tech transfer
- ✓ Clarification of regulatory comparability study design and execution

Clinical Advisory Panel

Acceleration Infrastructure

Our Grantees Value the Guidance from CIRM and our Clinical Advisory Panel





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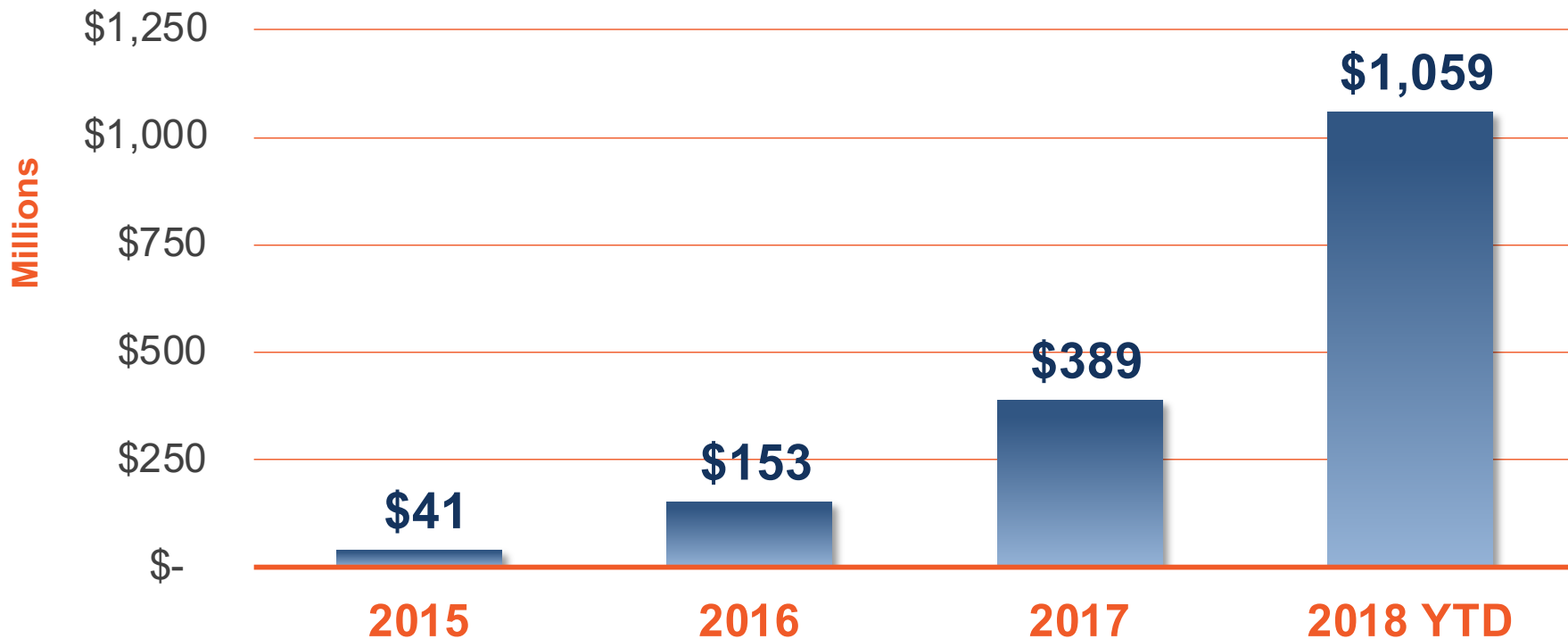
Increasing Industry Pull

Shyam Patel, PhD
Associate Director
Portfolio Review & Business Development
California Institute for Regenerative Medicine



Leveraged Funds: Partnership Events⁽¹⁾

Cumulative Partnerships Events Funding = **\$1,641M**



(1) Includes: license agreements, option agreements, and follow-on funding from industry partners and investors.

2018: \$1.059 Billion

Financing Event

Partnering Event

Phase
3



Kidney Failure

\$75M Series C

**\$150M, Fresenius
(Distribution)**

Phase
2



Rare Immune

**\$150M Series C
\$225.5M IPO**

**GSK
(Portfolio Acq.)**



Leukemia

\$56M Series B



Cancer

\$113M IPO



Spinal Cord Injury

**BioTime, Inc.
(Acquisition)**

Phase
1/2



X-SCID

**Mustang Bio
(License)**



Diabetes

\$80M Series D

**\$35M, Gore &
CRISPR (R&D)**

Phase
1



Cancer

\$30.5M Series B

IND



Cancer

\$144M Follow-On

Every Moment Counts | **Don't Stop Now**

Industry Alliance Program



- **Securing industry partnerships and funding** for CIRM's translational and clinical-stage projects.
- Industry partners strongly value:
 - CIRM funding and partnership model
 - Quality and breadth of CIRM portfolio
 - CIRM's clinical trial infrastructure



PANACEA VENTURE



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Improving Translation

Patricia Olson, PhD
Vice President: Discovery & Translation
California Institute for Regenerative Medicine

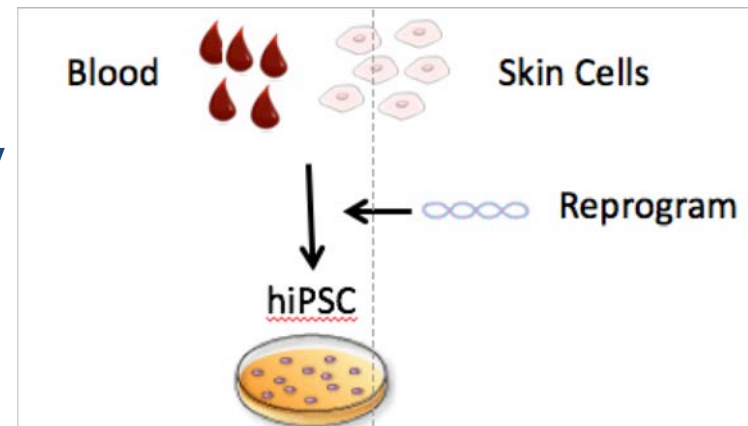


Strategic Infrastructure Updates

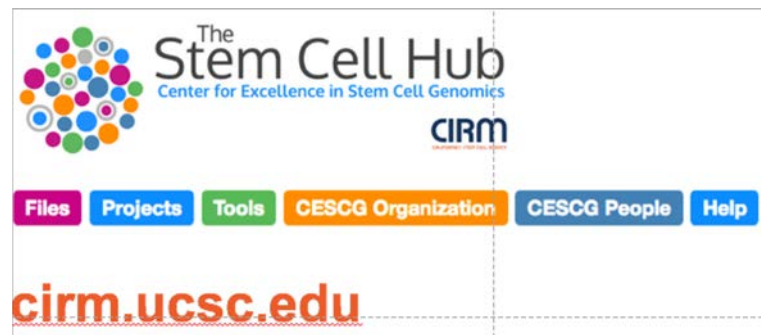
Improving Translation

- Translational Advisory Panels (TAPs)

- CIRM hiPSC Repository



- Stem Cell Genomics



Translational Advisory Panels

Accelerating Translation

- **Goal:** To accelerate timelines, increase the probability of successful completion of milestones on time and of progressing to the clinic
- **Status:** Kick-off TAP meetings held for 4 projects
- **Outcome:** Preclinical model issue solved by TAP advice

CIRM hiPSC Repository

The World's Largest hiPSC Bank

- 1556 iPSC lines available now through online catalog, 900 additional lines ready for banking
- 6 Disease classes, 17 diagnoses with matched controls
- Over 880 iPSC vials purchased by more than 90 users
- FUJIFILM Cellular Dynamics now CIRM Repository Manager with revenue share for State

CIRM hiPSC Repository

Key Features Facilitate Commercial Use

- IRB approved donor consent, documentation
- Standardized and QC'd line production
- Pre-Negotiated licenses for use
- Demographic and clinical data available

CIRM hiPSC Repository

Disease Collections

- Neurodevelopmental Disorders in Children
- Neurodegenerative Disease
- Blinding Eye Diseases
- Lung Diseases
- Liver disorders
- Cardiomyopathies



Stem Cell Genomics

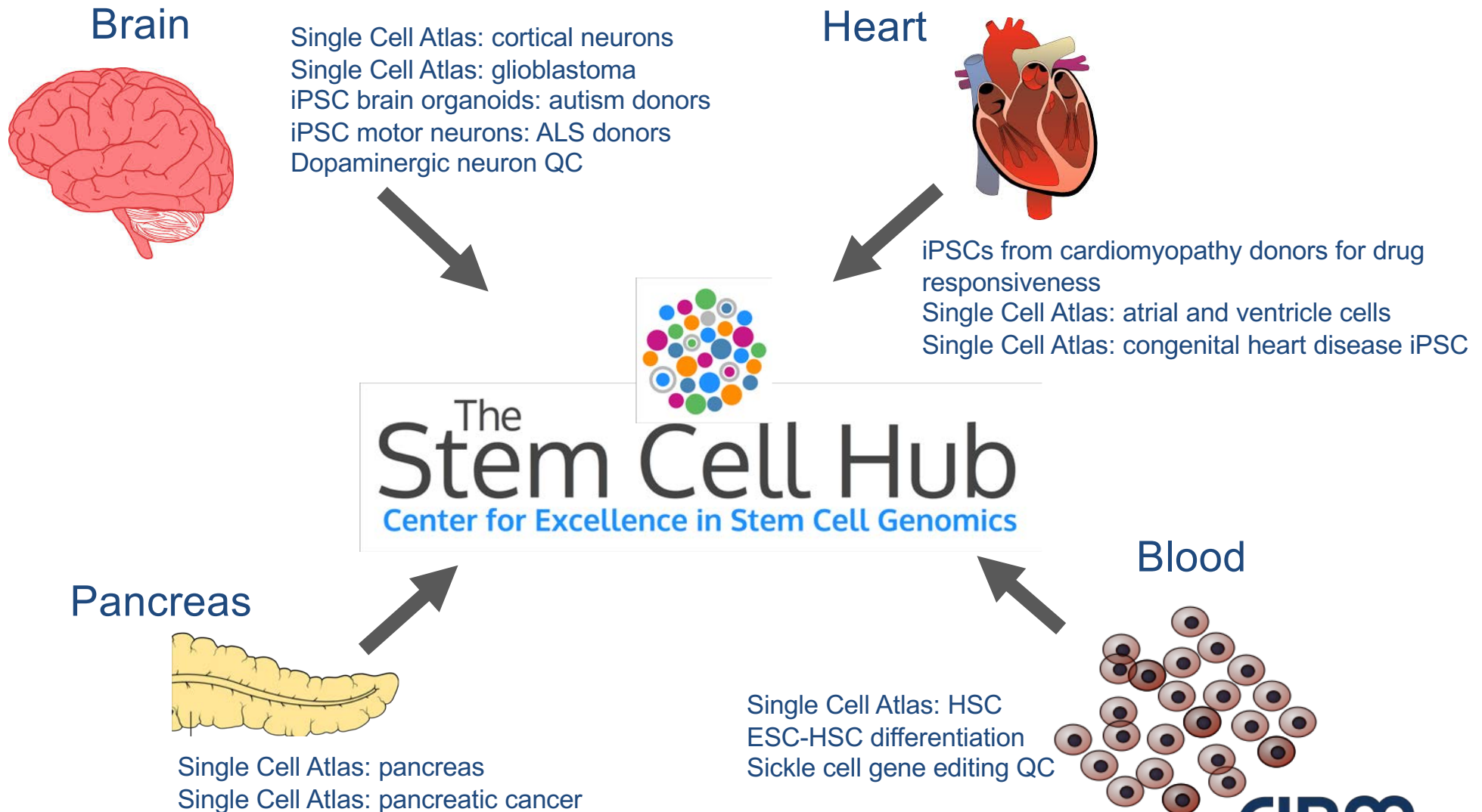
Improving Translation

Mission: Provide expertise and resources for the development and application of innovative genomics & bioinformatics approaches for stem cell biology and regenerative medicine

- Over 20 CA labs supported by sequencing and bioinformatics centers of excellence
- Unique Features
 - Focus: Human stem/progenitor cells
 - Metadata & primary analysis harmonization

Stem Cell Genomics: Outcome

Data Centralized Online for Public Use



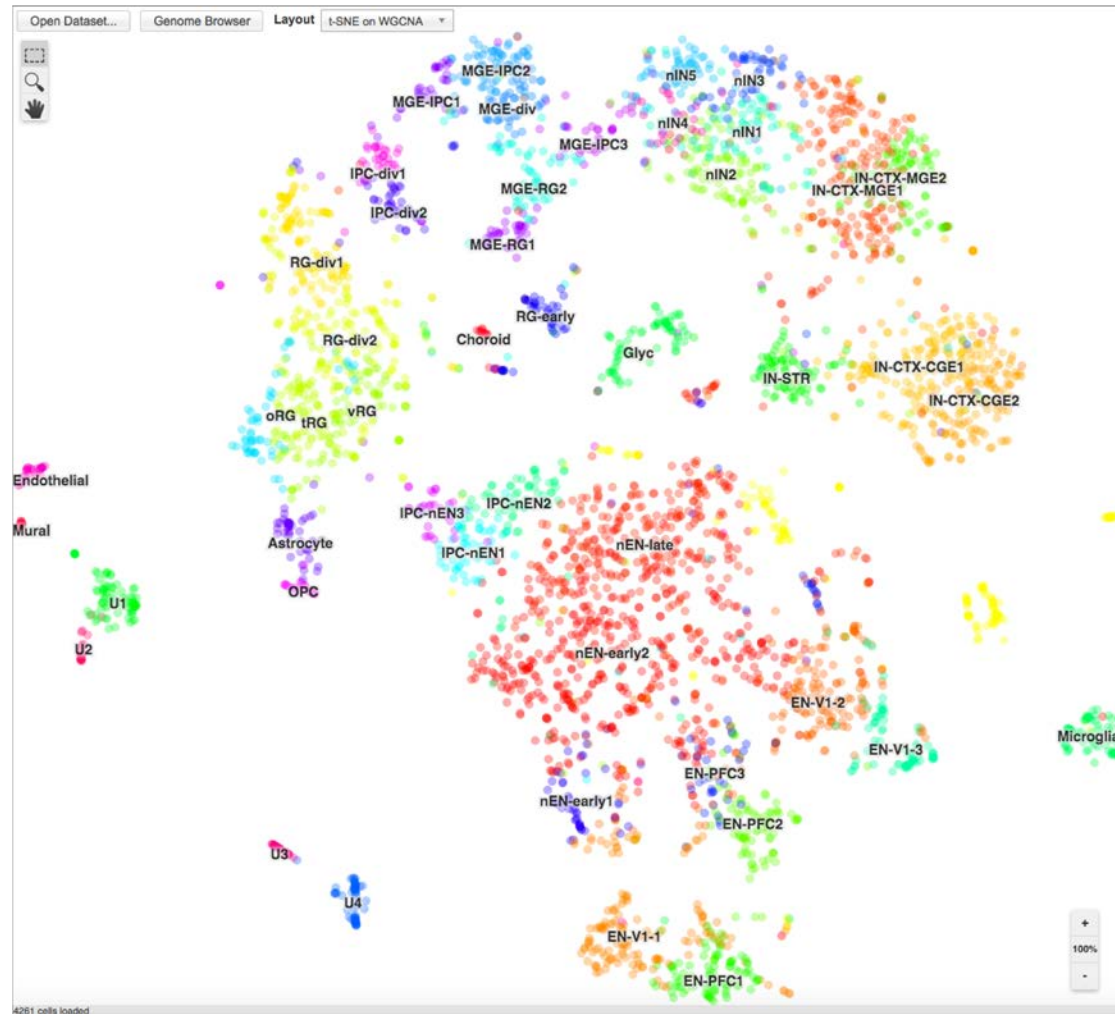
Stem Cell Genomics: Outcome

Bioinformatics Tool Development

- **Interactive Single Cell Viewer:** Single cell metadata & gene expression data from multiple formats (UCSC)
- **MISCE:** Metadata capture platform (JCVI)
- **NS Forest:** Machine learning platform to predict cell markers (JCVI)
- **SCIMITAR:** Cell developmental trajectory predictor (UCSC)
- **RIGGLE:** Transcription factor predictor for cell state transitions (UCSD)
- **Sample Psychic, NeuroTest:** Scorecards to estimate cell differentiation (UCSC, Scripps)

Bioinformatic Tools

Single Cell Viewer: Cortical Neurons*



*Science Dec 2017



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Communicating CIRM's Impact and Value Proposition in 2018

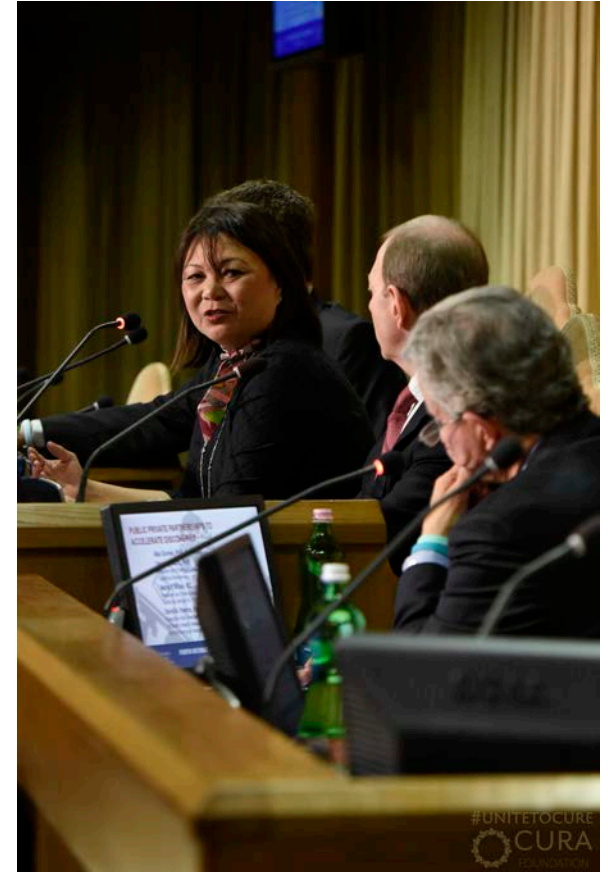
Kevin McCormack

Sr. Director Public Communications &
Patient Advocate Outreach
California Institute for Regenerative
Medicine



Communications: Scientific Community

- Unite to Cure Conference Vatican
- Phacilitate/World Stem Cell Summit
- Nat'l Academy of Sciences Reg Medicine
- Alpha Stem Cell events
- MORE TO COME.....



Communications: State Lawmakers

- Update to State Legislature
- State Assembly Biotech Committee Hearing



Communications: Media

San Francisco
Chronicle
SFGATE



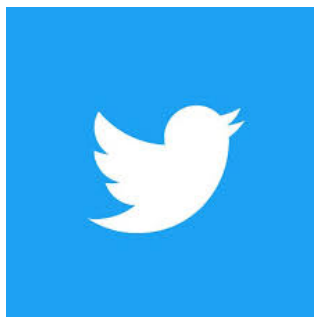
MILWAUKEE • WISCONSIN
JOURNAL SENTINEL
jsonline.com

The
New York
Times



UT
San Diego

Communications: Social Media



Got Questions About **Stem Cell Therapies** for **Sickle Cell Disease**?
Then "Ask The Stem Cell Team" on **FACEBOOK LIVE**

		
DON KOHN, MD Distinguished Professor Microbiology, Immunology & Molecular Genetics; Pediatrics UCLA Broad Stem Cell Research Center	ADRIENNE SHAPIRO Patient Advocate Sickle Cell Disease Founder, Axis Advocacy	MARK WALTERS, MD Director Blood & Marrow Transplantation Program UCSF Benioff Children's Hospital Oakland

Tuesday August 28th, Noon-1pm (PDT)

 **LIVE**  @CalifornianInstituteForRegenerativeMedicine

CIRM
CALIFORNIA'S STEM CELL AGENCY

Communications: Honoring a Colleague



Dr. Brian Sorrentino, PI on CIRM-funded clinical trial for X-Linked SCID