Public-Private Partnerships: New models for Collaborative Biomedical Research at UCSF

Jeffrey Bluestone, PhD
Executive Vice Chancellor and Provost, UCSF
August 2013
The number of approved first-in-class approved drugs for the treatment/cure of diseases is abysmal

Government, Industry and Academia partnerships to develop disease treatments cures have largely failed

U.S. venture capitalists are decreasing their investment in biotechnology and medical device start-ups, their concentration in critical therapeutic areas, and shifting focus away from the United States

The failure rates, cost, regulatory hurdles, difficulty in patient recruitment and lack of public support of drug development have reached all time highs.
The Research and Development process is problematic

Each New Drug

- Takes more than 10 years to develop
- Requires an investment of over $1B to bring a single innovative drug to market
- Years in the regulatory path
- No guarantee of insurance reimbursement
Number of new drugs approved has plateaued over the past 10 years

No significant increase in Research and Development Productivity in the past 10 years!

New models must be developed!
Pressures are increasing to develop new and innovative Industry-Academic Partnerships.

While NIH funding has been relatively flat, funding from private industry sources has increased over the past few years.
Academia/Industry/Government partnerships have historically been mainly exchange models

• Many industry-academia interactions have not been collaborative
• Sponsored research - typically funds idea with first option to license any resulting IP - NIH has historically been largely R01 focused
• Licenses, start-ups reflect taking up idea after conception
• Exchanges are indirect, with limited joint intellectual engagement
Historical Challenges to Industry-Academic Alliances

Differing Incentives, Goals, Cultures

**Academia**
- Recognition
- Publications
- Scientific freedom

**Industry**
- Timeline/Milestones
- Products
- Exclusivity
The New Public-Private Partnership Model: Mutual Investment/ Mutual Benefits

**UCSF**

- Enhances faculty research in translational science
- Educational opportunities for students/post-docs
- Access to tools and capabilities not readily available in academia

**Company**

- Early access to new targets and biology, accelerating translation of targets into therapies
- Enhancement of research and clinical trials via close involvement of experts in mechanistic and therapeutic areas

Catalyze discovery and development by leveraging the combined capabilities

Bring new therapies to patients – meeting AMC, NIH and stockholder missions
Building an effective PPP at UCSF

UCSF-based innovation ecosystem: to drive innovation in the Bay Area and globally

Novel Industry partnerships: to accelerate biologic drug development

Precision Medicine: Mechanism, not disease based, university and industry-based partnerships to advance clinical research
Mission Bay - building a new center of innovation
Circa - 2000
Ecosystem Community – Mission Bay: Marrying research, clinical care, and industry

Arch Ventures
Column Group
Novo Ventures
Synergenics
USVP
Versant Ventures

Abunda
Ablexis
Allopartis
Carmot Therapeutics
CV Ingenuity
Delpor
Entrotech
Gemmus Pharma
GigaGen
Green Pacific Biologicals
Kanjilla
Kilimnjaro
Kiverdi
Locus Development
Lypro Biosciences, Inc.
Medicus Biosciences
Metafold Therapeutics
MLC Dx

Nichi Bei Bio
Omniox
Oncosynergy
Osprey Pharmaceuticals
Pathway Therapeutics
Pharmajet
Photoswitch Biosciences
Refactored Matriials
SeaChange Pharmaceuticals
Siluria Technologies
Silver Creek
Solidus Biosciences
Targenics
Teselagen
Tunitas Therapeutics
Unhwa UCSA
ZoneOne Pharma

UCSF Children, Women, and Cancer Hospital
UCSF ecosystem to support Start Ups and Links to Industry and Capital

**Resources**
- Start-up in a Box
- Garage Incubator Space

**Funding**
- Bridging the Gap Funds
- Genus Awards/X-prizes

**Start-up Expertise**
- Entrepreneurs in Residence
- Academy of Biomedical Entrepreneurs
- Expert Affiliates

**Industry Investment**
- Program for Breakthrough Biomedical Research
- New Technology Partnerships
- Cross faculty appointments
UCSF: creating novel public-private alliances

Pfizer
QB3 alliance – fostering collaboration in early stage research with 4 UC campuses and Pfizer
CTI – accelerating the path from discovery to the clinic: >20 campuses, Pfizer. UCSF as a cornerstone partner

Sanofi
Funding breakthrough science
Collaborative oncology clinical development
Target discovery in diabetes

Onyx
Collaborative oncology discovery all stages of research and clinical development
Example of a Partnership: Pfizer Centers for Therapeutic Innovation

CTI VISION
Accelerate the translation of academic innovative discoveries into early stage Proof-of-Mechanism in the clinic – basic concept ➔ Phase I trial

CTI STRATEGY
Co-localization on MB campus and co-partnership, joint teams for rapid translation into the clinic

CTI Approach
Access to Pfizer clinical infrastructure (PD/PK, drug development)
Equal partnership – IP, goals and strategy alignment
Joint Development Team Alliance

UCSF/Sanofi jointly develop and execute strategy to market

Joint Clinical Development Teams (multiple programs)

**UCSF**
- Clinicians
  - Disease treatment expertise
- Translational Scientists
  - Biomarkers animal models mechanistic

**Sanofi-aventis**
- Medical Monitors
- Clinical Scientists
- Clinical Operations
- Drug production/Packaging
- Translational Scientists
- Program Management

IND | Phase 1 | Phase 2 | Phase 3 | Market
Joint Target Discovery:  
Alliance Innovation

**Collaborative**

- Integrated teams with scientists from both academia and pharma

**Incentives**

- Milestone payments for target deliverables
- Potential for further collaborative drug development or target reverts back to investigator if progression not made by pharma

**Expectation management/cultural alignment**

- Alliance/program management
The Immune Tolerance Network:

AN ACADEMIC – GOVERNMENT – INDUSTRY – FOUNDATION PARTNERSHIP

jointly funded by:

NIAID
National Institute of Allergy & Infectious Diseases

Juvenile Diabetes Research Foundation

calr dedicated to finding a cure

Over 40 industry partners
The Immune Tolerance Network

What the ITN does

Fund, plan, implement, monitor and assess investigator-initiated clinical trials of novel tolerance-promoting therapies in:

- Autoimmune diseases
- Transplantation
- Allergy & Asthma

Plan and provide services to investigators to carry out unique, comprehensive mechanistic studies

The ITN Goals

- To advance the clinical application of immune tolerance by performing high quality clinical trials of emerging therapeutics integrated with mechanism-based research.

  In particular, the ITN aims to:
  - establish new tolerance therapeutics
  - develop a better understanding of the mechanisms of immune function and disease pathogenesis
  - identify new biomarkers of tolerance and disease.
By the numbers

10+ countries with ITN sites or members
~20 centralized, standardized core assay facilities
50+ transplant patients off all immunosuppression
30+ clinical trials completed or in progress
100+ published manuscripts; 6 NEJM, 150+ meeting presentations
~90 full-time employees
450+ clinical sites/investigators, around the world
6000+ subjects consented in ITN trials
25,000+ assays performed by ITN cores
400,000+ clinical specimens stored in the ITN repository

Information-sharing system called TrialShare to instantly access data amassed during the clinical trial
Withdrawal of Immunosuppressive drugs in pediatric live-donor livers (Sandy Feng - UCSF)
Increased B cells is a marker of tolerant kidney recipients.
Rituximab In ANCA-Associated Vasculitis (RAVE)

PI: Ulrich Specks, Mayo Clinic
John H. Stone, Johns Hopkins

Study Goals
To determine if B-cell depletion by rituximab induces stable remissions in AAV by re-establishing B-cell tolerance to the ANCA target antigens

Study Summary
• 194 patient, randomized, double-masked, placebo-controlled trial
• Significantly more patients in the rituximab group reached and retain total remission in the control group even at 18 months (P < 0.001).
• The treatment response to rituximab was superior to cyclophosphamide in patients who entered the trial with a severe disease flare (P = 0.01).
• Fewer patients in rituximab arm had one or more of the protocol-selected AEs by 6 months.
• Approved new labeling by FDA in 2011.

Acknowledgements

Office of Innovation, Technology and Alliances

Keith Yamamoto, Erik Lium, Stephanie Robertson, Karin Immerman
Stephanie Marrus, Jim Kiriakis

Jerry Nepom, Benaroya
Larry Turka, MGH
Bill St. Clair, Duke
Peter Sayre, UCSF
Dan Rotrosen, NIAID

Regis Kelly, PhD
QB3 Director

Douglas Crawford, PhD
QB3 Director of Industry Alliance