

## Summary of the 2007 Weinstein Cardiovascular Development Conference

Union Station Conference Center

Crowne Plaza Hotel

Indianapolis, Indiana, May 10<sup>th</sup> - 12<sup>th</sup>

### i. Meeting Organization

Responsibility for organizing the 2007 Conference fell to Local Organizing Committee. The committee members were Simon Conway, Loren Field, Tony Firulli, Mark Payne, Michael Rubart, Weinian Shou, and Lei Wei, all of whom are faculty in the Department of Pediatrics and the Herman B Wells Center for Pediatric Research, at the Indiana University School of Medicine. There were also two ad hoc committee members, Michiko Watanabe from Case Western Reserve University and Katherine Yutzey from the University of Cincinnati. In addition to infrastructural planning, the Local Organizing Committee was responsible for selecting abstracts for platform presentations, selection of the keynote speakers, and organization of the overall program.

The National Weinstein Committee was consulted throughout the organization process for advice on the program content. The National Committee members were Raymond Runyan, Kersti Linask, Loren Field, James Martin, Brian Black, John Burch, and Katherine Yutzey

Control of the conference website (<http://www.weinsteinmeeting.org>), which is housed at the University of Arizona, was passed to the Indiana organizing committee in the fall of 2006. As in the past, links to previous sites were maintained on the home page to provide an electronic history of the conference. Control of the website will now be passed to the Houston organizers for the 2008 meeting.

### ii. Meeting Attendance

There were 340 attendees at the 2007 meeting, of which 115 were faculty and 225 were students or postdoctoral fellows. It was truly an international meeting, with 57 of the registrants hailing from institutes in 12 other countries (Canada, China, England, France, Germany, Israel, Italy, Japan, Korea, the Netherlands, Spain, and Sweden).

### iii. Meeting Program

#### a. Platform Presentations

The organizing committee received over 200 abstracts, from which 42 were selected for platform presentation which were organized into 9 sessions. The sessions represented a broad spectrum of topics relevant to cardiovascular development. As the Weinstein Conference traditionally tries to encourage the participation of young investigators, platform presentations were awarded predominantly to postdoctoral fellows and young investigators below the rank of Associate Professor. Indeed, 31 of the presentations were given by students or post-docs. Table 1 lists the platform sessions, as well as the chairpersons, speakers, and titles of the presentations. Care was taken to limit the number of talks per lab to one (only two exceptions were made).

#### b. Poster sessions

Posters were located in alcoves immediately adjacent to the eating area and bar in the Union Station Grand Hall. There was sufficient space for all posters to be up for the entire meeting. Formal poster session (where the presenter was asked to man their poster) were held on Thursday (even numbered posters) and Friday (odd numbered posters) evening. Laptop computers with searchable data bases of the abstracts were present in each alcove to enable participants to rapidly locate posters of interest.

#### c. Workshops

The program included four workshops, with the intent of fostering discussion and debate on topical areas of cardiac development. The workshops were held in two sessions, with two workshops running concurrently during each session. In general, each workshop had 2 to 4 concise presentations, which were followed by open discussions. Table 2 lists the four workshops, along with the moderators and speakers.

There were also several presentations by NIH staff. Pat Mastin (NIEHS) presented during the Vascular Development session, and Charlene Schramm (NHLBI) presented during the Vavulogenesis session. Dr. Schramm also held a Workshop on NIH funding opportunities and grantsmanship.

#### d. Keynote presentations

Two distinguished scientists, Drs. Oliver Smithies and Margaret Kirby, were the 2007 keynote speakers. Dr. Smithies (who is currently the Excellence Professor of Pathology and Laboratory Medicine, University of North Carolina at Chapel Hill) has a long and distinguished career in molecular genetics, and is largely credited with the co-development of gene targeting techniques. Dr. Smithies spoke on "Chance, opportunity and planning in research". Dr. Kirby (who is currently a Professor of Pediatrics, Cell Biology and Biology at Duke University) is known world wide for her work on the role of neural crest cells in the genesis of congenital heart defects. Dr. Kirby spoke on "How many heart fields does it take to make a heart". The keynote speakers were selected to continue the emphasis that the Weinstein Conference places on young scientists: Dr. Smithies and Dr. Kirby are both exemplary role models for young investigators.

#### e. Awards

A number of awards were presented to meeting attendees. American Association of Anatomists Travel Awards were given to individuals with outstanding posters. The recipients were Airon Wills (Duke University), Catherine Risebro (UCL Institute of Child Health, London), Sigalit Zchut (Rhode Island Hospital, Providence), Xiao-Qing Zhao (National Institutes of Health), Mary Holtz (Medical College of Wisconsin), Jamie Wikenheiser (Case Western Reserve University), and Willem Hoogaars (Academic Medical Center, Amsterdam). Additional Travel Award recipients were Lucile Miquerol, Kryn Stankunas, Mark Stevens, Todd Townsend, Sophie Astrof, Marion Cooley, Dorota Szumska, Hosouk, and Marc-Michael Zaruba.

#### f. Business meeting

A number of issues were discussed during the Business meeting, and are summarized below:

- Jim Martin presented an overview of the 2008 Conference in Houston
- It was decided via majority vote to hold the 2010 Conference in Amsterdam, and to move the Pittsburg Conference to 2011

- Eric Svensson proposed to hold the 2012 Conference in Chicago; a majority voted in favor of this
- Shoumo Bhattacharya had a PowerPoint Presentation pitching the Sanger Center in Cambridge as a potential site for a future meeting
- It was decided not to plan a conference site more than 5 years in advance of the conference date
- It was suggested to incorporate a "forum page" onto the Weinstein Webpage, and to have the Webpage be sponsored by an organization (SDB, AAA, etc) to ensure archival of meeting data
- Other points were raised but not resolved (i.e., speaker COI disclosures, meeting length, poster session length, concurrent workshops, etc)

#### iv. Meeting Finances

The total cost of the 2007 conference was \$151,700. Revenues from the registration fees were \$52,000. The remaining \$99,700 was recovered from the fund raising activities of the Local and National Organizing Committees. Table 3 provides a summary of the sponsors for the 2007 Conference.

## **Table 1. Platform Presentations**

Platform Session I: Cardiomyocyte cell cycle regulation (Chairs: Loren Field, Indiana University and Youngsook Lee, University of Wisconsin Medical School)

- Airon Wills (Duke University): A Cardiomyocyte and Epicardial Cell Addition during Cardiac Homeostasis in Adult Zebrafish
- Heather Evans-Anderson (Cincinnati Children's): FOXO transcription factors in the regulation of cardiac myocyte proliferation and myocardial growth during development
- Gert van den Berg (Academic Medical Centre, Amsterdam): 3D Visualization of proliferation in cardiac and extracardiac mesoderm
- Chulan Kwon (Gladstone Institute): Canonical Wnt Signaling is Required for Mammalian Cardiogenesis by Regulating Cardiac Progenitors

Platform Session II – Myofibrogenesis (Chairs: Lei Wei, Indiana University and Jeffrey Robbins, Cincinnati Children's Hospital Medical Center)

- Frank Naya (Boston University): MEF2A controls a costameric network of genes in cardiac muscle
- Catherine Risebro (UCL Institute of Child Health, London): Investigating the role of Prox1 in the developing heart
- Jorg Manner (Georg-August-University of Göttingen): High resolution in vivo imaging of the cross-sectional deformations of contracting embryonic heart loops using optical coherence tomography (OCT).
- Kathryn Hentges (The University of Manchester): Mouse mutants with defects in cardiovascular development isolated from balancer chromosome mutagenesis screens

Platform Session III – Transcription Factors in Cardiogenesis (Chairs: Anthony Firulli, Indiana University and Brian Black, University of California San Francisco)

- Sigalit Zchut (Rhode Island Hospital, Providence): Histone deacetylase 1(HDAC1) is Essential for Cardiac Development in Zebrafish
- Kees Boogerd (Academic Medical Centre, Amsterdam): In search for partners of Tbx2 and Tbx3
- Joshua Vincentz (Indiana University): Cooperative function of the transcription factors Nkx2.5 and Mef2c during heart development
- Kimara Targoff (Skirball Institute of Biomolecular Medicine): Nkx Genes Regulate Heart Tube Extension in Zebrafish
- Martin Lange (Max Planck Institute for Molecular Genetics, Berlin): DPF3 – a new key transcription factor – bridging chromatin remodeling and cardiac muscle specification

Platform Session IV – Vascular Development (Chairs: Michiko Watanabe, Case Western Reserve University and Pat Mastin, NIEHS, National Institutes of Health)

- Xiao-Qing (National Heart, Lung and Blood Institute): Connexin43 in the Epicardium is Required for Normal Coronary Development
- Mary Holtz (Medical College of Wisconsin) Endothelial-Specific Ablation of Serum Response Factor Results in Vascular Instability and Embryonic Lethality
- Richard Goodwin (University of South Carolina School of Medicine): VEGF-A164 regulates coronary endothelial proliferation, but not tubulogenesis
- Jan Stenman (Harvard University): Canonical Wnt Signaling in Endothelial Cells is Essential for Central Nervous System Vascularization and Blood-Brain Barrier Development
- Jamie Wikenheiser (Case Western Reserve University): Effect of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on hypoxia-inducible factor-1 alpha during chick cardiogenesis

Platform Session V – Cardiac Conduction System Development (Chairs: Michael Rubart, Indiana University and Luis Polo-Parada, University of Missouri, Columbia)

- Jau-Nian Chen (University of California, Los Angeles): Molecular and physiological mechanisms underlying embryonic cardiac rhythmicity in zebrafish
- Willem Hoogaars (Academic Medical Center, Amsterdam): Tbx3 acts as a genetic switch for heart pacemaker formation
- Thomas Brand (University of Würzburg): Genetic analysis of Popdc1 and Popdc2 function in mouse and zebrafish heart
- Lucile Miquerol (Developmental Biology Institute of Marseilles): Clonal analysis of the origin of the mammalian ventricular conduction system
- George Porter (Yale): Deletion of the cardiac L-type calcium channel (CaV1.2) causes embryonic death

Platform Session VI – Signaling Pathways in Cardiogenesis (Chairs: Weinian Shou, Indiana University and Jim Martin, Texas A & M Health Science Center)

- Kryn Stankunas (Stanford): Endocardial Brg1 Represses ADAMTS1 to Maintain the Microenvironment for Myocardial Morphogenesis
- Kai Jiao (University of Alabama at Birmingham): Myocardial Smad4 Is Essential for Cardiogenesis in Mouse Embryos
- Laura Barbosky (Duke): Sonic hedgehog Modulates Addition of the Secondary Heart Field to the Arterial Pole
- David McCulley (Texas A&M Health Science Center, Houston): BMP4 Function is Required in Second Heart Field-Derived Myocardium for Endocardial Cushion Remodeling, Outflow Tract Septation, and Semilunar Valve Development
- Karen Niederreither (Baylor): Retinoic Acid Deficiency Alters Secondary Heart Field Formation and NKx2.5 Regulation

Platform Session VII – Valvulogenesis (Chairs: Katherine Yutzey, Cincinnati Children's Medical Center and Andy Wessels, Medical University of South Carolina)

- Mark Stevens (University of Arizona): Distinct Functions of the MAP3Kinases, MEKK3 and MEKK4, for Heart Valve Development
- Elaine Shelton (University of Cincinnati): Tbx20 and Twist1 function in endocardial cushion mesenchyme
- Tom Doetschman (University of Arizona): TGF-beta2 is required in vivo for epithelial-mesenchymal transformation, collagen fibrolysis, and differentiation, condensation and maturation of mesenchyme during valvulogenesis
- Elaine Wirrig (The Medical University of South Carolina): The Role of Cartilage Link Protein 1 (Crtl1) in Heart Development
- Todd Townsend (Vanderbilt University): Endocardial cells transformation is dependent on Par6 regulation of RhoA

Platform Session VIII – Animal Models of Congenital Heart Disease (Chairs: Simon Conway, Indiana University and Christopher Brown, Vanderbilt University)

- Zhen Zhang (Health Science Center, Texas A&M University System): A new mutant series provides insights into sensitivity of heart development to Tbx1-mRNA dosage
- Hongming Zhou (Indiana University): Titration of Pax3 expression levels during morphogenesis of the outflow tract
- Caroline Jenkins (University of Oxford): Polycomb Repressive Complex I plays a cell autonomous role in cardiac development
- Sophie Astrof (Weill Medical School of Cornell University): Multiple functions of E11A and E11B splice isoforms of fibronectin in cardiovascular development
- Marion Cooley (Medical University of South Carolina): Loss of fibulin-1 in mice causes a DiGeorge syndrome-like phenotype

Platform Session IX – Translational Models of Congenital Heart Disease (Chairs: Mark Payne, Indiana University and Jamie Lohr, University of Minnesota)

- Dorota Szumska (University of Oxford): A Novel Murine Model with Features of Vacterl and Caudal Regression Indicates a Common Genetic Origin for both Syndromes
- Tomoki Nakamura (Cincinnati Children's Hospital Medical Center): Mediating ERK1/2 Signaling Rescues Congenital Heart Defects in a Mouse Model of Noonan Syndrome
- Fabian Chen (University of California at Los Angeles): Muscleblind 2, a RNA binding protein important in Myotonic Dystrophy and Cardiac Conduction
- Eugene Yu (Roswell Park Cancer Institute): Duplication of the entire 22.9-Mb human chromosome 21 syntenic region on mouse chromosome 16 causes cardiovascular abnormalities

## Table 2: Workshops

1. Single vs. multiple developmental heart fields (Moderators: Anthony Firulli, Indiana University and Margaret Kirby, Duke University)

- Silvia Evans (University of California San Diego): Cardiac progenitor populations
- Brian Black (University of California San Francisco): The right ventricle, outflow tract, and interventricular septum are derived from the second heart field
- Sigolène Meilhac (Institut Pasteur): Clonal segregation between the first and second myocardial lineages
- Vincent Christoffels (University of Amsterdam): The caudal and posterior second heart field, and the origin of the left ventricle in chicken and mouse

2. Cardiomyogenic stem cells during development (Moderators: Loren Field, Indiana University and Paul Riley, University College London Institute of Child Health)

- Steven Kattman (McEwen Centre for Regenerative Medicine, Toronto): ES cell derived cardiovascular progenitor cells
- Nicola Smart (UCL Institute of Child Health, London): Epicardial derived vascular progenitors

3. Cardiac Neural Crest (Moderators: Simon Conway, Indiana University and Anne Moon, University of Utah)

- Jon Epstein (University of Pennsylvania): Cardiac neural crest and interactions with endothelium
- Henry Sucov (University of Southern California): Mouse models of PTA that implicate a defect specifically in AP septation
- Rob Gourdie (Medical University of South Carolina): Cardiac neural crest ablation inhibits compaction and Electrical function of conduction system bundles

4. Imaging Cardiovascular Development and Physiology (Moderators: Michael Rubart, Indiana University and Igor R. Efimov, Washington University)

- Igor R. Efimov (Washington University, St. Louis): Biophotonic Imaging of Embryonic Heart
- Yvonne Tallini (Cornell University, Ithaca): Embryonic Murine Heart using a Genetically Encoded Calcium Inhibitor
- Mary Dickinson (Baylor): Imaging fluid motions and heart function in vertebrate embryos

**Table 3: Sponsors of the 2007 Weinstein Conference**

Sponsor:	Amount:
NIH-NHLBI	\$10,000
NIH-ORD	\$10,000
NIH-NICHD	\$3,000
NIH-NIEHS	\$3,000
AHA	\$2,000
March of Dimes	\$5,000
Am. Assn. Anat.	\$3,000
Host Institution (multiple sources)	\$38,700
Develop. Dynamics	\$500
Developmental Biology	\$4,000
Oxford U. Press	\$500
Eli Lilly	\$7,500
Novartis	\$5,000
Medtronic	\$5,000
Visualsonics	\$1,000
W. Nuhsbaum, Inc	\$1,000
Harlan	\$500