



# Engineered Cells and Tissues as Platforms for Discovery and Therapy

March 9–12, 2017 | Fairmont Copley Plaza | Boston, Massachusetts | USA

## Scientific Organizers:

**Laura E. Niklason**, Yale University, USA

**Milica Radisic**, University of Toronto, Canada

**Nenad Bursac**, Duke University, USA

*Tissue engineering, cell therapies and regenerative medicine have witnessed accelerated progress over the past decade. Fueled by fundamental discoveries in iPS, progenitor, and developmental cell biology, cells are now used as building blocks to create model systems, as testing platforms for drug interventions and as active therapeutics. High-throughput production of various types of “microtissues” or “organoids” is making increasing contributions to our understanding of human development, disease and repair. This Keystone Symposia meeting will highlight these rapidly emerging cell-based tools for fundamental and applied discovery. Culture systems ranging from simple cell cluster organoids, to highly advanced cell-electronic composites, will be discussed. In addition, the encouraging progress that is being made in cell-based therapies across a range of organs and diseases will be featured. The goal of this meeting is to provide a state-of-the-art review of both pluripotent and differentiated cells as tools for discovery and therapy. A broad range of cell types and therapeutic areas will be included.*

## Session Topics:

- Biologically-Based Microsystems
- Workshop 1: Human iPS Cells in Disease Modeling
- Engineered Organoids for Biological Discovery
- Cell-Based Platforms for Drug Screening
- Workshop 2: Career Development
- Engineered Tissues in Cancer
- The Current Wave – Cells as Therapeutics
- Workshop 3: Exosomes for Therapeutic Applications
- The Next Wave – Cells as Building Blocks

**Abstract Deadline: December 13, 2016**

**Discounted Registration Deadline: January 13, 2017**



Note: Abstracts can still be submitted online for poster presentation.

Upper image of bioengineered brain-like cortical tissue courtesy of National Institute of Biomedical Imaging and Bioengineering, NIH

Meeting Hashtag: #KScelltissue

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# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Engineered Cells and Tissues as Platforms for Discovery and Therapy (K1)

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### THURSDAY, MARCH 9

#### Arrival and Registration

### FRIDAY, MARCH 10

#### Welcome and Keynote Address

\***Laura E. Niklason**, Yale University, USA

**Danilo Tagle**, NCATS, National Institutes of Health, USA  
*Catalyzing Translational Innovation*

#### Biologically-Based Microsystems

\***Jordan S. Miller**, Rice University, USA

**Jeffrey Beekman**, University Medical Center Utrecht, Netherlands  
*Epithelial Organoids as Tools for Discovery in Cystic Fibrosis*

**Takanori Takebe**, Yokohama City University / Cincinnati Children's Hospital Medical Center, Japan  
*De novo Generation of Diverse Organ Buds from Stem Cells*

**Todd C. McDevitt**, Gladstone Institutes, USA  
*Complex Cellular Models of Embryonic Development*

**Eduardo Marban**, Cedars-Sinai Medical Center, USA  
*Self-Assembling Cardiac Microtissues and their Progeny in Clinical Therapeutics*

#### Workshop 1: Human iPS Cells in Disease Modeling

\***Todd C. McDevitt**, Gladstone Institutes, USA

**Olga Kashpur**, Tufts University, USA  
*Reprogramming of Diabetic Foot Ulcer Fibroblasts to iPSCs Reveals an Altered Wound Healing Potential*

**Adriana Blazeski**, Johns Hopkins University, USA  
*Engineered Heart Slices Represent Syncytial Model of Arrhythmogenic Cardiomyopathy*

**Miguel Angel Hermida**, Heriot Watt University, Scotland  
*3D Printing of Multilineage Human Glioblastoma Models*

**Alex Ng**, Harvard Medical School, USA  
*Transcription Factor-Wide Engineering of Human Cell Types from Pluripotent Stem Cells*

**Jeffrey D. Serrill**, City of Hope, USA  
*Using NGN3 Fusion Protein Constructs to Elucidate Optimal Cytoarchitecture in hPSC-Derived Pseudoislets*

**Kacey Ronaldson**, Columbia University, USA  
*Adult-Like Cardiac Tissue Bio-Engineered From Human Ips Derived Cells Enables Predictive Modeling of Toxicity and Disease*

#### Engineered Organoids for Biological Discovery

\***Gary A. Gintant**, AbbVie, USA

**Anjelica Leticia Gonzalez**, Yale University, USA  
*Interstitial and Microvascular Interfaces in Inflammatory and Fibrotic Disease*

**Nenad Bursac**, Duke University, USA  
*Microtissues for Studies of Skeletal Muscle Physiology and Disease*

**Eva-Maria Dehne**, TissUse GmbH and Technische Universitat Berlin, Germany

*Microphysiological Systems – State of the Art and Future Perspectives*

**Abhishek Ananthanarayanan**, Invitrocue Pte Ltd., Singapore  
*Short Talk: Hepatocyte Spheroid Cultures in Galactosylated Cellulosic Sponge for Drug DMPK and Efficacy Testing*

#### Poster Session 1

### SATURDAY, MARCH 11

#### Cell-Based Platforms for Drug Screening

\***Nenad Bursac**, Duke University, USA

**Gary A. Gintant**, AbbVie, USA  
*Development of an in vitro Pro-Arrhythmia Assay*

**Sharon Presnell**, Organovo, Inc., USA  
*Bioprinting of Liver Organoids*

**Milica Radisic**, University of Toronto, Canada  
*Evaluation of Cardiotoxicity Using Biowires*

**Karl-Heinz Krause**, University of Geneva Faculty of Medicine, Switzerland  
*Engineered Neural Tissues as Human Disease Models*

**Patrick Guye**, InSphero AG, Switzerland  
*Short Talk: A Microfluidic Multi-Tissue Culturing Platform Based on 3D Microtissue Spheroids*

#### Workshop 2: Career Development

\***Laura E. Niklason**, Yale University, USA

\***Milica Radisic**, University of Toronto, Canada

\***Nenad Bursac**, Duke University, USA

#### Engineered Tissues in Cancer

\***Milica Radisic**, University of Toronto, Canada

**Biju Parekkadan**, Rutgers University, USA  
*Engineered Cancer-Stroma Microenvironments*

**Jordan S. Miller**, Rice University, USA  
*Models of Lung Cancer Invasion and Metastasis*

**Alison P. McGuigan**, University of Toronto, Canada  
*TRACER: An Engineered Tumor for Exploring Cellular Phenotype and Microenvironment in Hypoxic Gradients*

**Deena Mohamad Ameen Gendoo**, Princess Margaret Cancer Centre, Canada  
*Short Talk: Comprehensive Assessment of the Genetic Landscape of Matched Primary, Xenograft, and Organoid Models for Pancreatic Cancer*

#### Poster Session 2

### SUNDAY, MARCH 12

#### The Current Wave – Cells as Therapeutics

\***Laura E. Niklason**, Yale University, USA

**Joanne Kurtzberg**, Duke University, USA  
*Game Changers: Using Cord Blood to Help the Brain*

**Thomas Schulz**, ViaCyte, Inc., USA  
*Development of Stem-Cell Derived, Islet Replacement for Type 1 Diabetes*

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**Gordana V. Vunjak-Novakovic**, Columbia University, USA  
*Human Cardiac and Tumor Platforms for Study of Disease*

**Jorge Mansilla-Soto**, Memorial Sloan Kettering Cancer Center, USA  
*Short Talk: CRISPR/Cas9-Targeted Chimeric Antigen Receptor  
Enhances CAR T Cell-Mediated Tumor Eradication*

### Workshop 3: 3-Dimensional Cellular Models

\***Laura E. Niklason**, Yale University, USA

**Amir Ali Khan**, University of Sharjah, United Arab Emirates  
*Unravelling the Gene Expression Profiles of the Early Differentiation of  
Mesenchymal Stem Cells into Neural Lineage*

**Sijie Sun**, University of Washington, USA  
*Bioengineering 3D Human Skin Equivalent with Perfused  
Microvascular Network to Study Host-Viral Interactions During Infection*

**Christopher Hubert**, Cleveland Clinic, Lerner Research Institute, USA  
*Modeling Glioblastoma through Cancer Stem Cell Organoids*

**Anastasia Korolj**, University of Toronto, Canada  
*Biomimetic Curvature in Cell Culture Platform Improves Podocyte  
Differentiation in vitro*

**Sara Nunes Vasconcelos**, University of Toronto, Canada  
*Diabetes Impairs Arterio-Venous Specification in Engineered Vascular  
Tissues in a Perivascular Cell Recruitment-Dependent Manner*

**Ryan LaRanger**, University of Texas Southwestern Medical Center,  
USA  
*Engineering Reconstituted Decellularized Mouse Lungs with  
Conditionally Reprogrammed Human Bronchial Epithelial Cells*

### The Next Wave – Cells as Building Blocks

\***Sara Nunes Vasconcelos**, University of Toronto, Canada

**Miguel Gonzalez-Andrades**, Harvard University, USA  
*Tissue Engineered Corneas: A Clinical Reality?*

**Daniela Franco Bueno**, Institute of Teaching and Research of Sirio  
Libanes Hospital, Brazil  
*Alveolar Bone Tissue Engineering for Cleft Lip and Palate*

**Laura E. Niklason**, Yale University, USA  
*Engineered Arteries in Renal Failure and Arteriosclerosis*

### Meeting Wrap-Up: Outcomes and Future Directions (Organizers)

#### MONDAY, MARCH 13

#### Departure