

Microengineered Physiological Bio-mimicry: Human Organs-on-a-Chip

D. Dan Huh

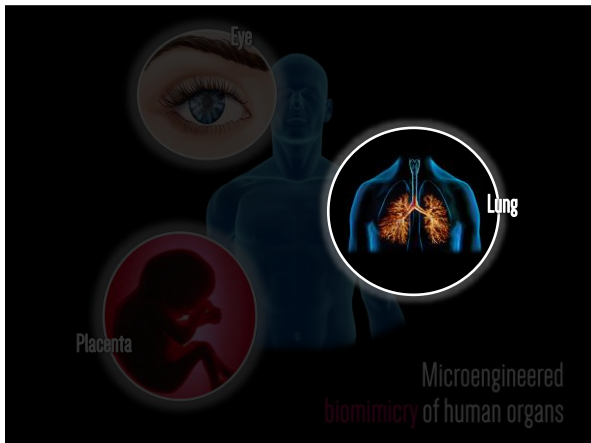
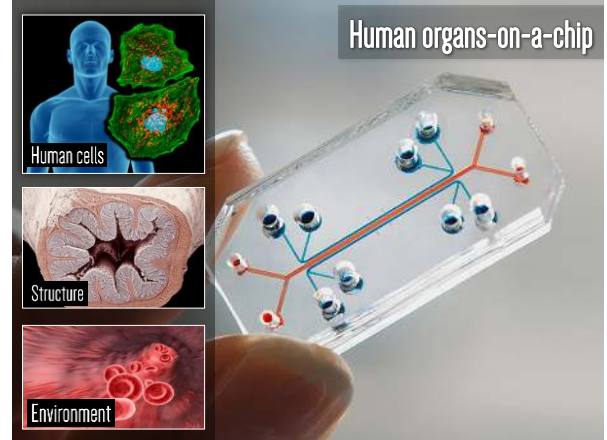
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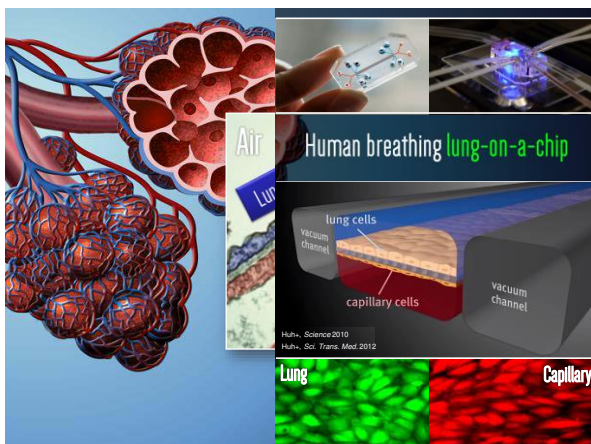
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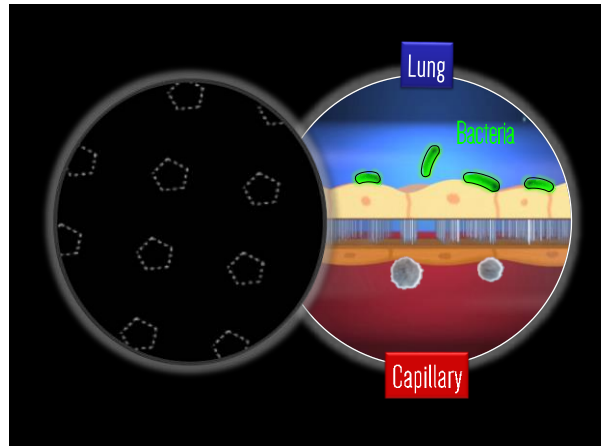
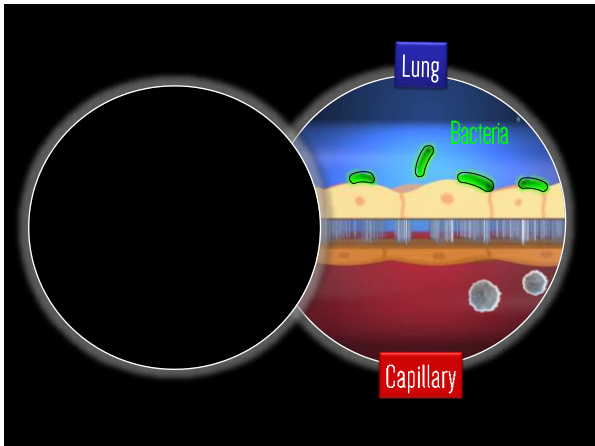
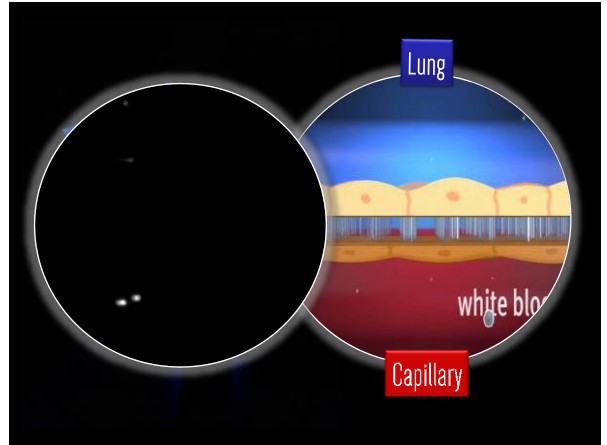
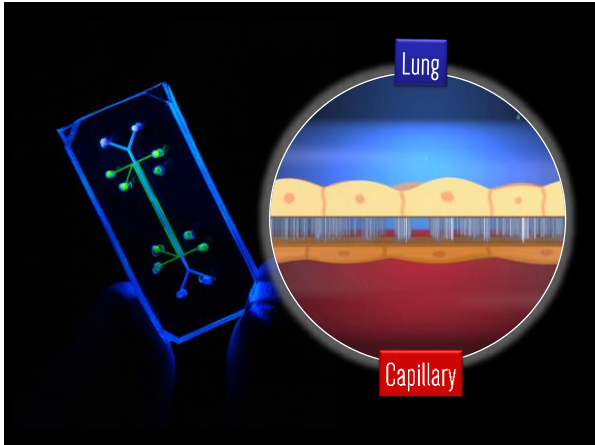
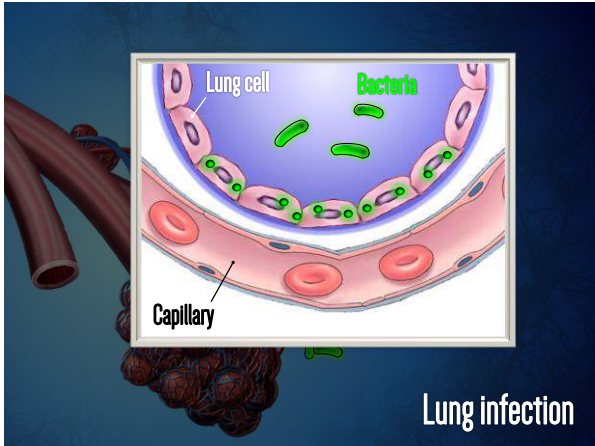
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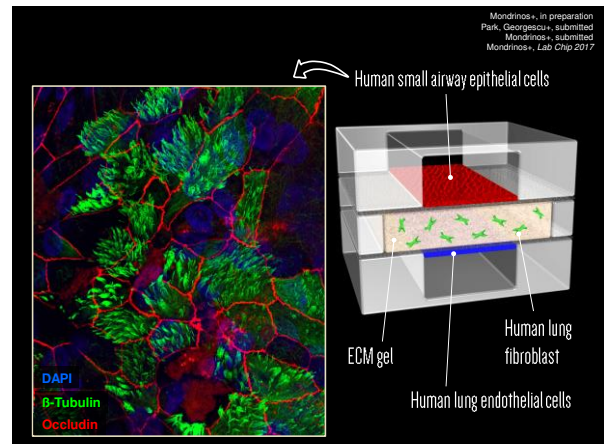
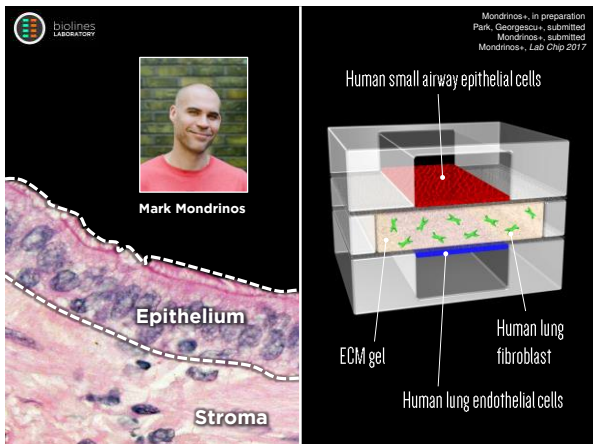
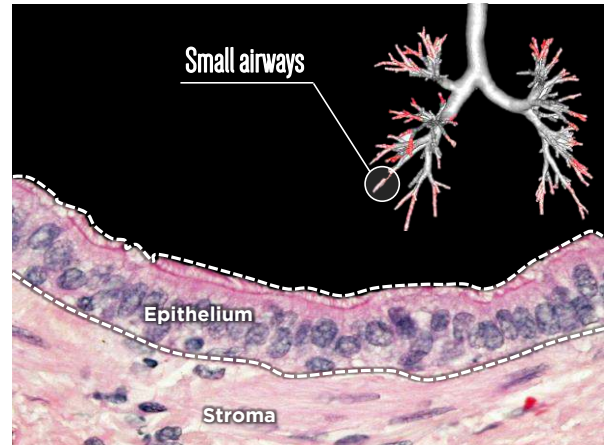
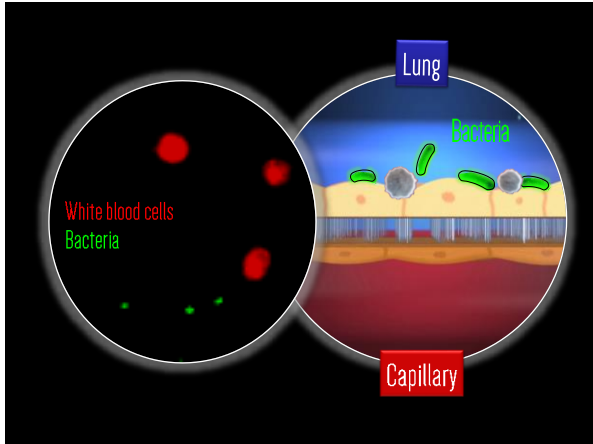


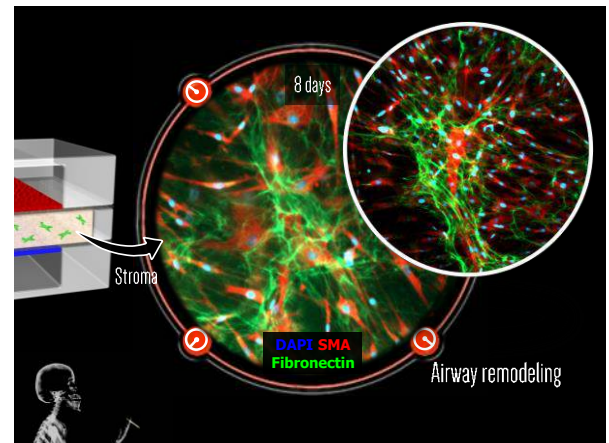
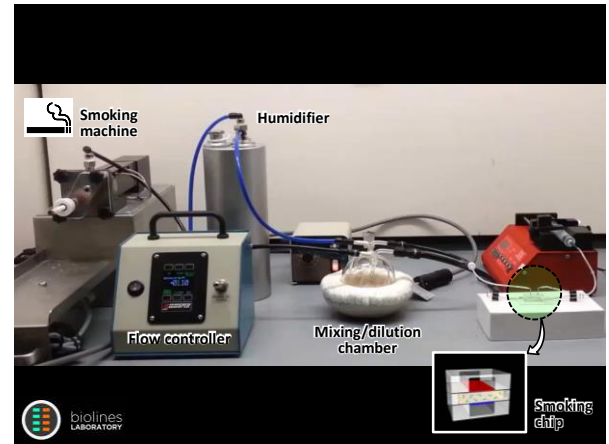
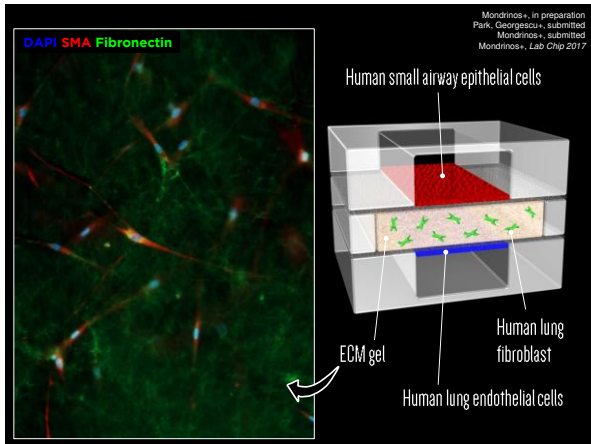
How to design and create organ chips?

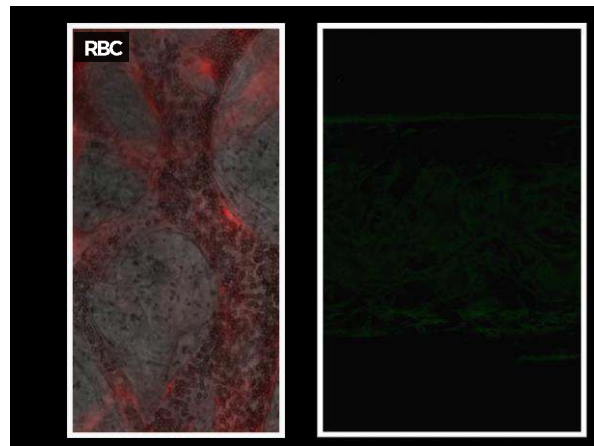
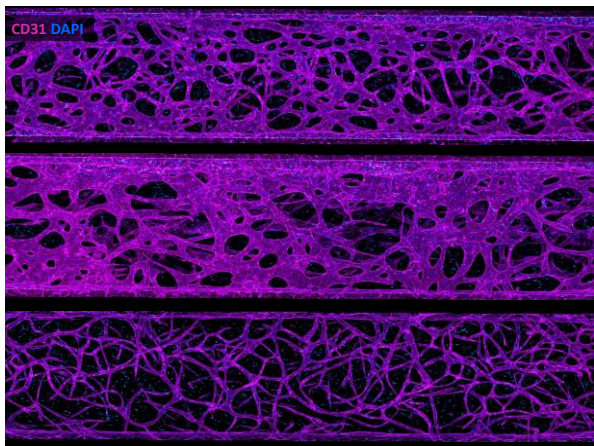
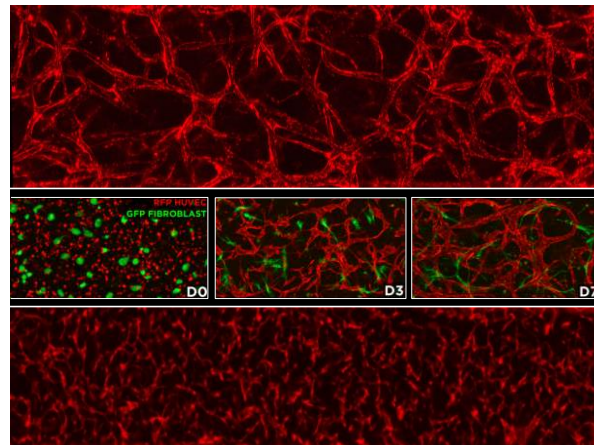
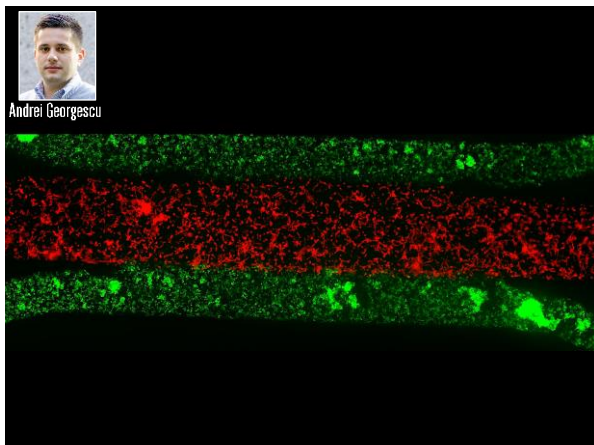
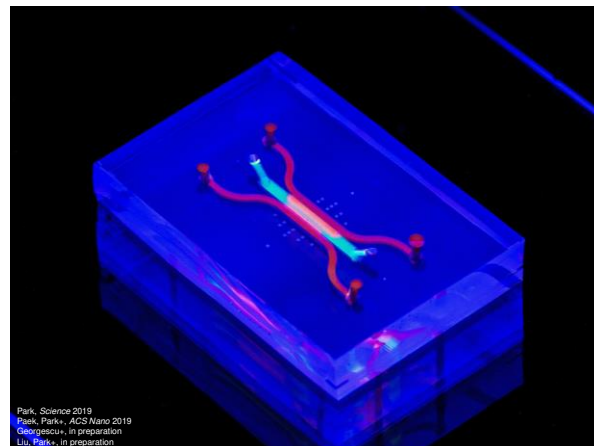
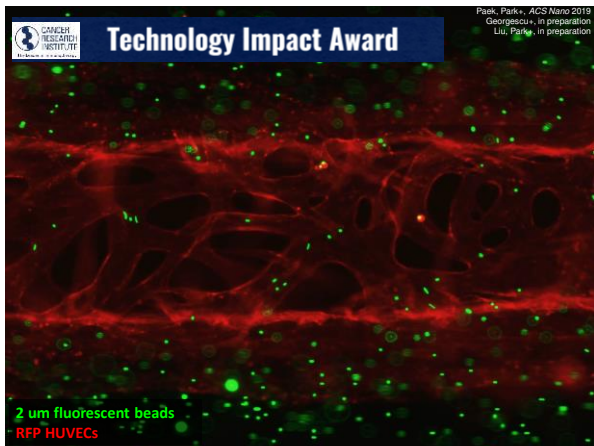


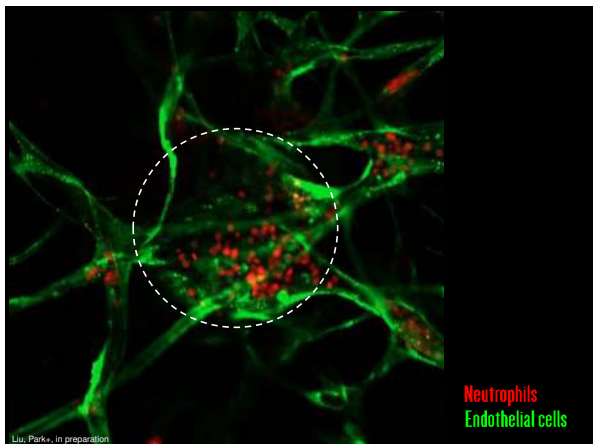
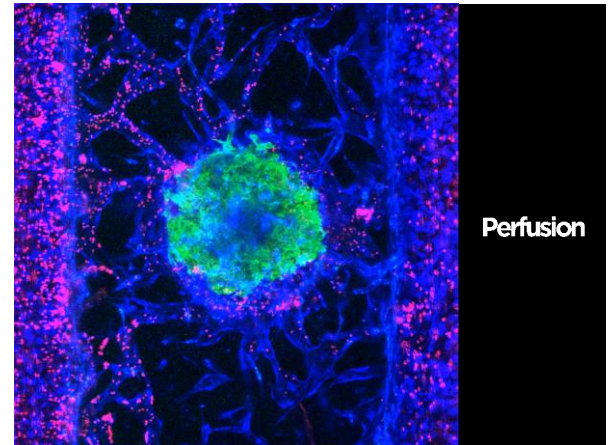
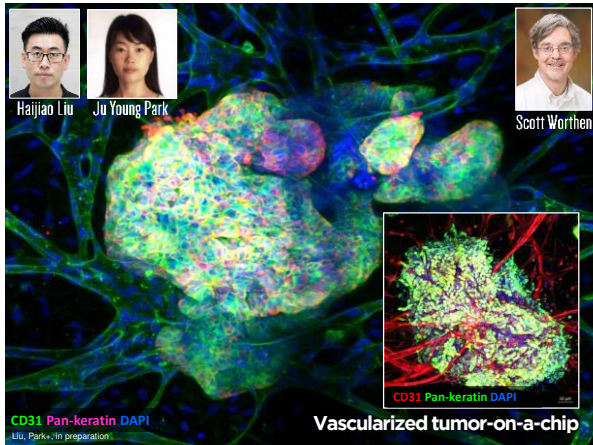
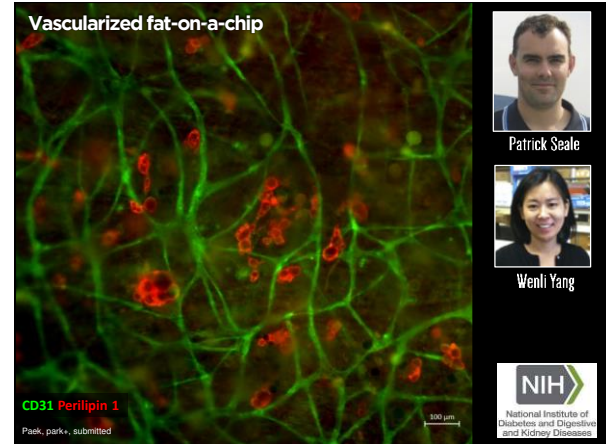
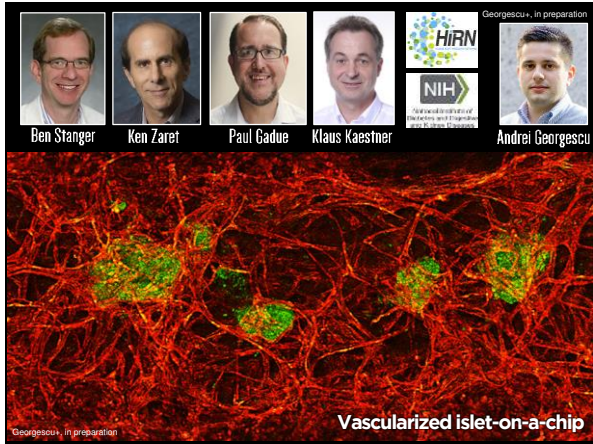
Mimicking complex organ-level functions

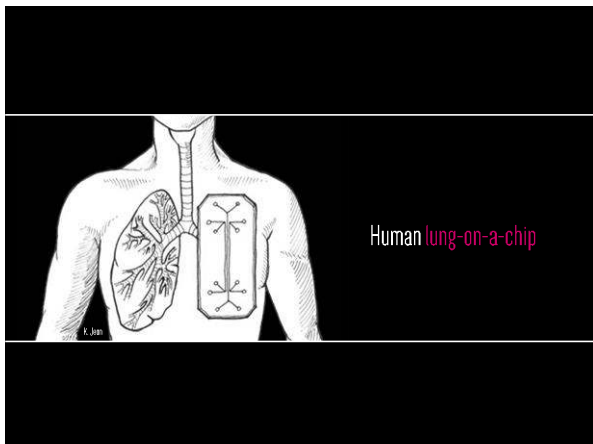
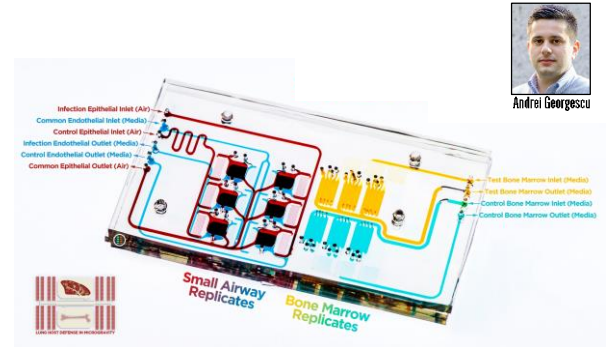
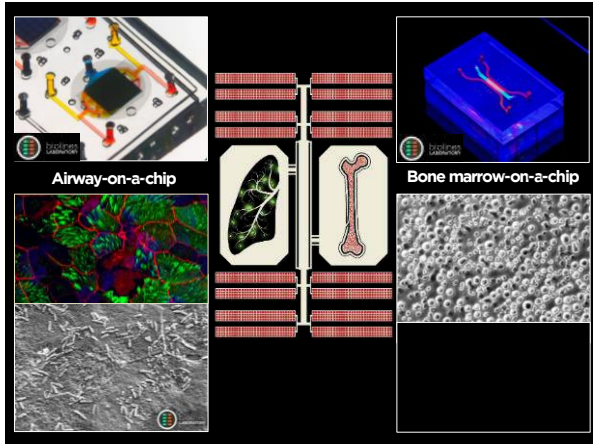


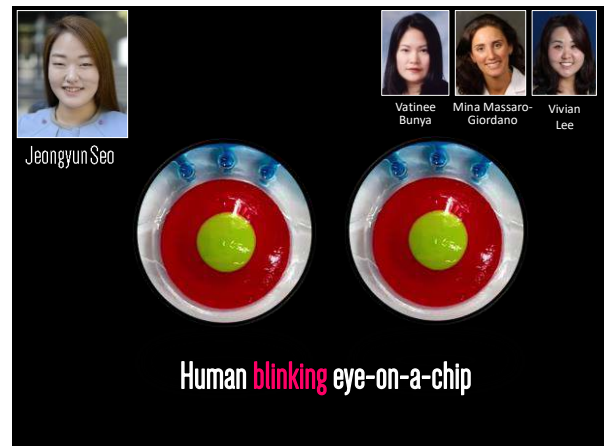
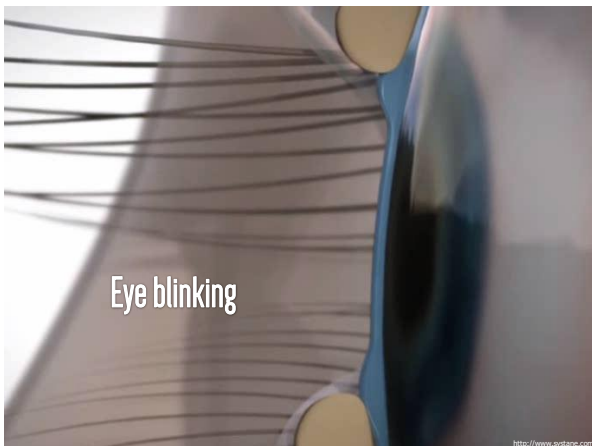
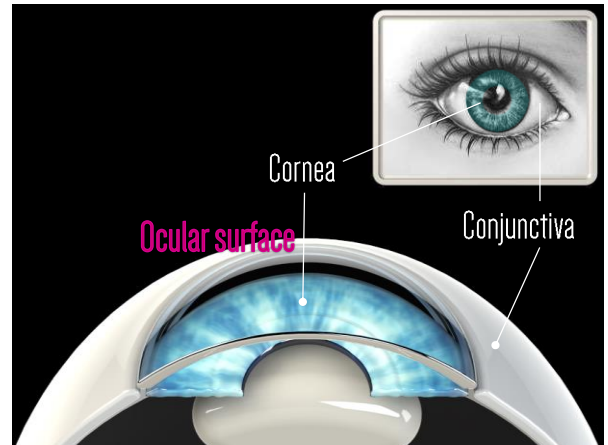
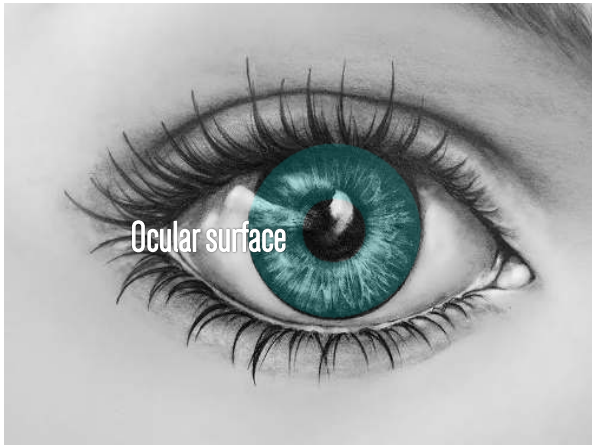
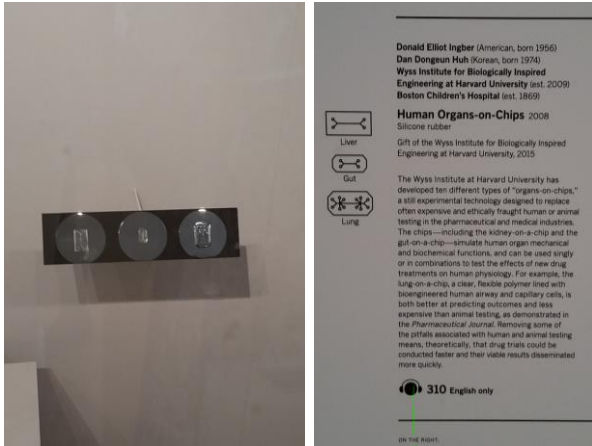


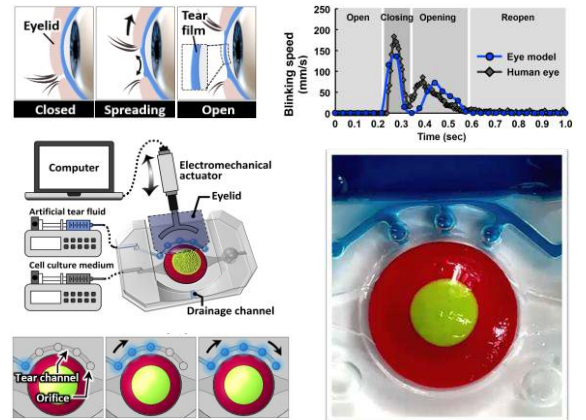
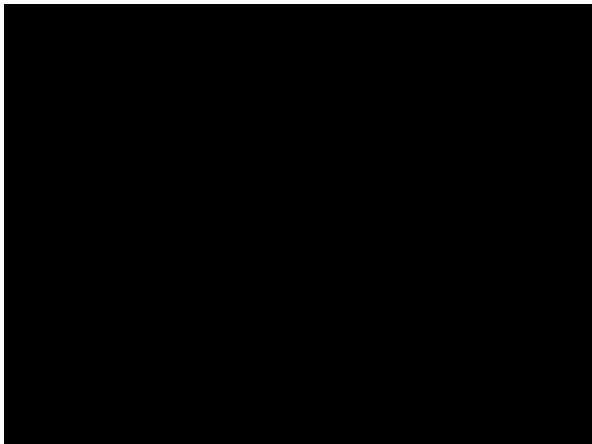
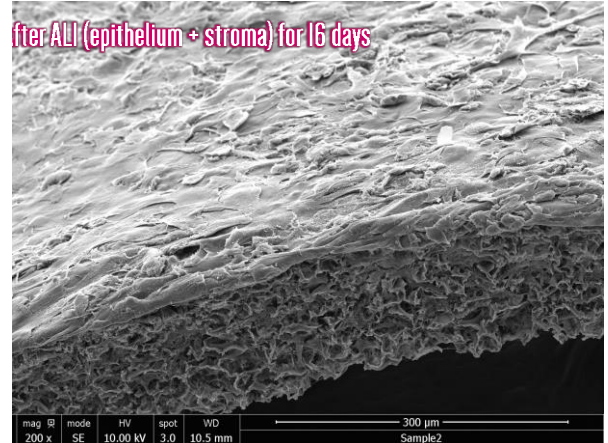
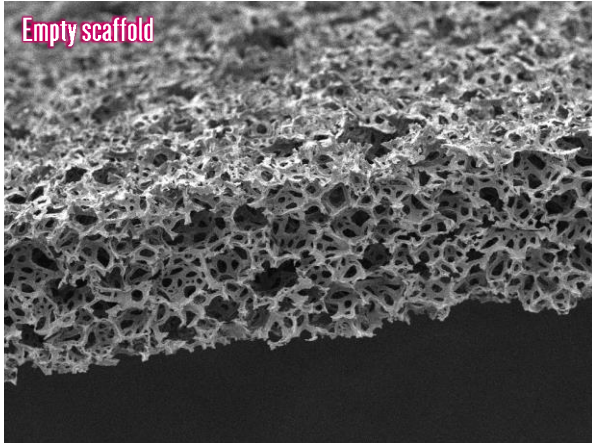
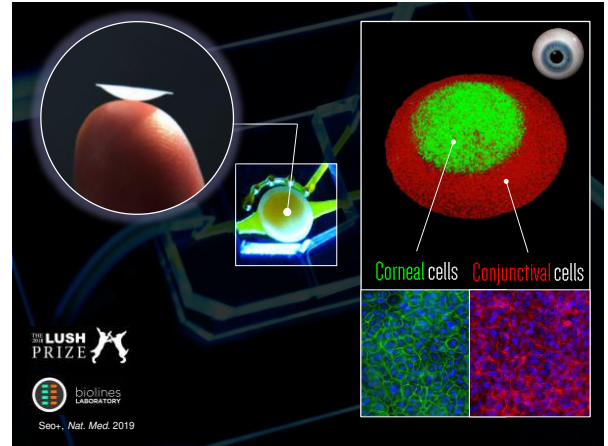
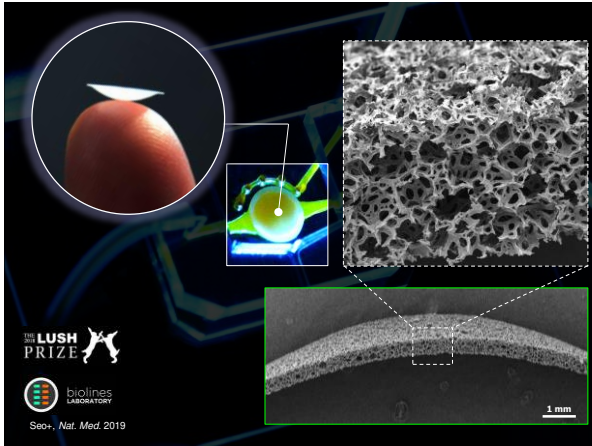


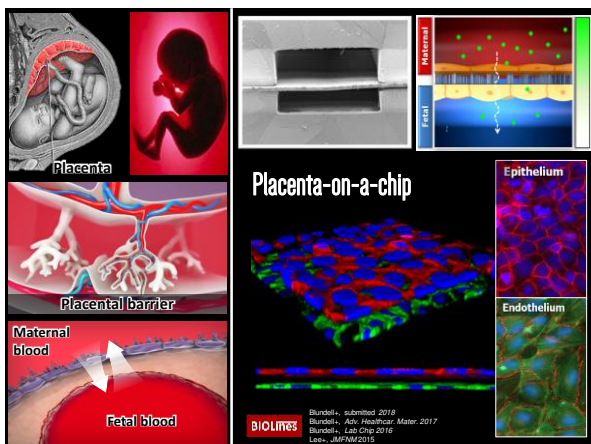
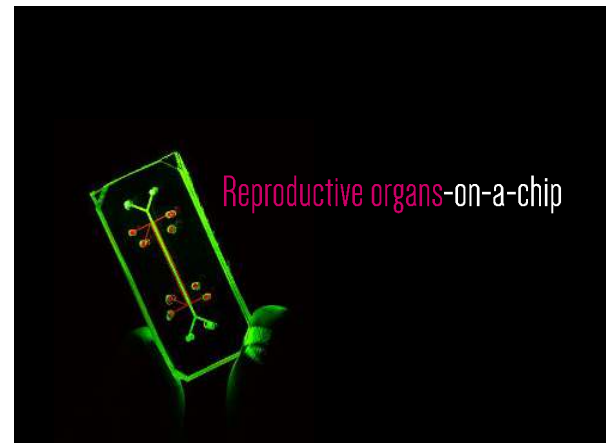
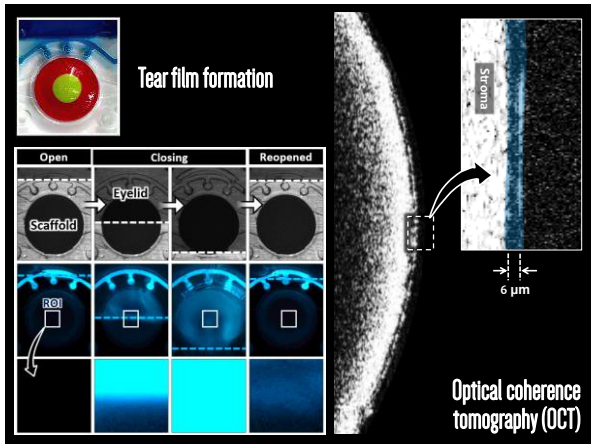


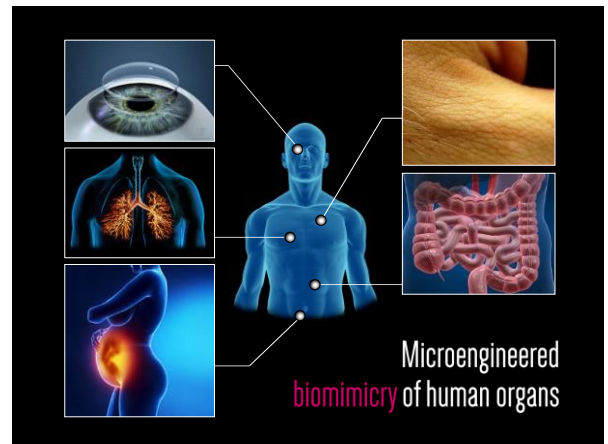
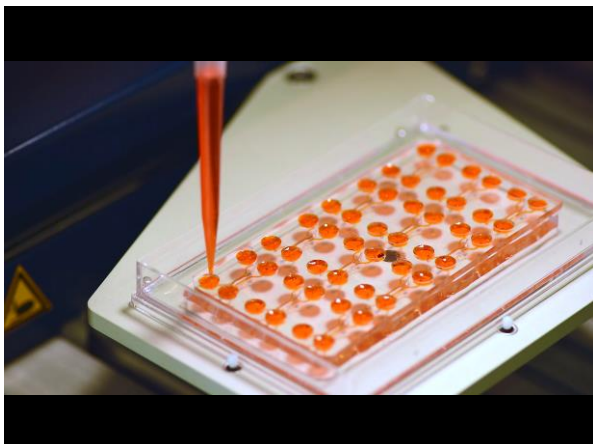
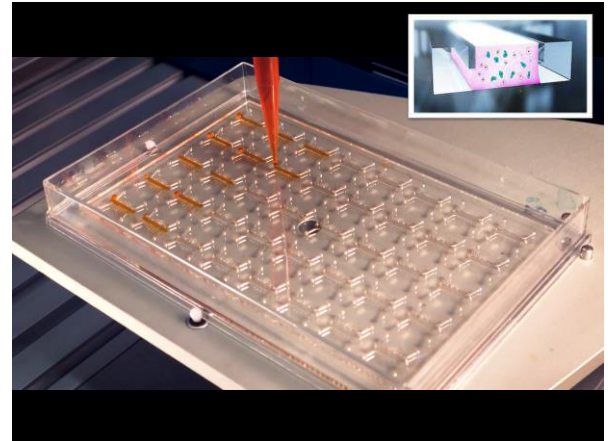
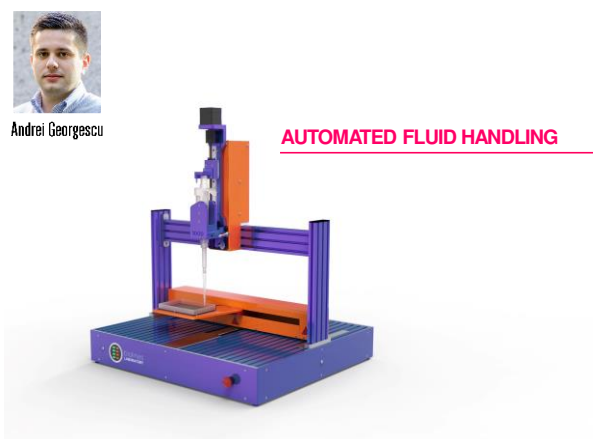
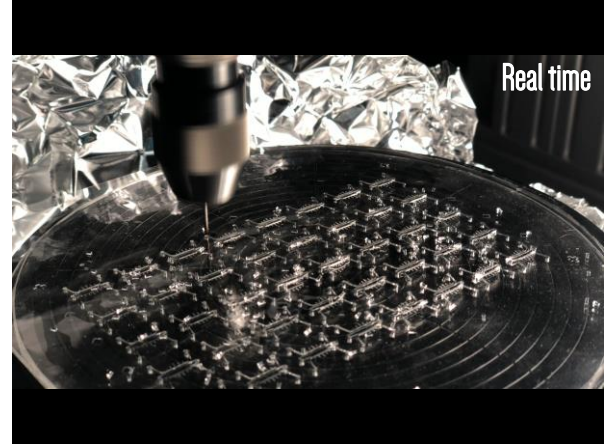














NATIONAL INSTITUTE OF HEALTH **FDA**

"This work completely changed the way we think about *in vitro* model systems, and became a basis for launching new funding programs"

NIH & FDA (Aug. 2011)

Human breathing lung-on-a-chip



"NIH will collaborate with DARPA and FDA to develop a chip to screen for safe and effective drugs far more swiftly and efficiently than current methods, and before they are tested in humans"

Obama (Sep. 2011)

NIH/NCATS Tissue Chip Program

U.S. Department of Health & Human Services | National Institutes of Health

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About Tissue Chip

- How the Tissue Chip Program Works
- Tissue Chip in Action
- Tissue Chip Frequently Asked Questions
- Tissue Chip Funding Information
- Tissue Chip Initiatives & Projects
- Meet Chip

About Tissue Chip

More than 30 percent of promising medications have failed in human clinical trials because they are found to be toxic despite promising pre-clinical studies in animal models. An additional 65 percent of candidate drugs fail due to lack of efficacy.

To address this problem, NCATS, through its Tissue Chip for Drug Screening program, along with other NIH Institutes and Centers, the Defense Advanced Research Projects Agency (DARPA) and the Food and Drug Administration (FDA), leads the development of 3-D platforms engineered to support living human tissues and cells, called tissue chips or organ-on-chips.

Contact

Daniel Tappe, Ph.D.


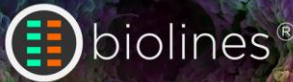
Next Phase for Tissue Chips

On Oct. 18, 2016, NCATS announced a new funding opportunity for the Tissue Chip for Drug Screening program as part of an effort to better assess therapeutics for clinical trials.

emulab

Our emulated human technology is understanding how chemicals, medications, chemicals, and foods affect human health

Living Human Emulation

TEDx

PERSPECTIVES

In recent years, the bioinspired microsystems approach has been used to establish microengineered models that recapitulate the structural and functional complexity of human organs such as the liver, heart, lung, intestine, kidney, bone and brain^{1,2,3,4}. A representative example is the lung-on-a-chip microdevice that recapitulates the mechanically active alveolar-capillary barrier in the

INNOVATION

Organs-on-chips at the frontiers of drug discovery

Eric W. Esch, Anthony Bahinski and Dongyan Huh

<http://tedxtalks.ted.com/video/Engineering-human-organs-onto-a>

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NIH DIRECTOR'S NEW INNOVATOR AWARD

NIH National Institute of Diabetes and Digestive and Kidney Diseases

DARPA

NIH National Heart, Lung, and Blood Institute

CANCER RESEARCH INSTITUTE The Leader in Immunotherapy

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