“PhysioMimetics”: How Integration of Systems Biology with “Organs-on-Chips” May Humanize Therapeutic Development

Wednesday
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3:00 pm
Wu & Chen Auditorium
Levine Hall

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Abstract
“Mice are not little people” – a refrain becoming louder as the strengths and weaknesses of animal models of human disease become more apparent. At the same time, three emerging approaches are headed toward integration: systems biology analysis of cell-cell and intracellular signaling networks in patient-derived samples; 3D tissue engineered models of human organ systems, often made from stem cells; and micro-fluidic and meso-fluidic devices that enable 3D “microphysiological systems (MPSs)” to be sustained, interconnected, perturbed and analyzed for weeks in culture. This talk will describe our recent work integrating these approaches to study chronic inflammatory diseases, with an emphasis on building and characterizing 3D mucosal barrier models of endometrium and gut, and deployment of these models to analyze inflammation and multi-MPS cross talk.

Bio
Linda G. Griffith, PhD (UC Berkeley, Chemical Engineering), is the School of Engineering Teaching Innovation Professor of Biological and Mechanical Engineering and MacVicar Teaching Fellow at MIT, where she directs the Center for Gynepathology Research and the Human Physiome on a Chip Project. She led development of MIT’s undergraduate major in Biological Engineering, which launched in 2005 as MIT’s first new major in almost 40 years. Several technologies from her lab have been commercialized, including the 3D Printing process for tissue engineering, and the Liverchip. She is a member of the National Academy of Engineering and her awards include a MacArthur Foundation Fellowship and the Popular Science Brilliant 10 Award. She has served as a member of two NIH Advisory Councils (NIDCR and NIAMS) and currently serves on the Advisory Committee to the Director of the NIH.

Britton Chance Distinguished Lecture