CARNEGIE MELLON UNIVERSITY
BME 2020 FALL SEMINAR SERIES

"Organ-on-a-Chip" Technologies: Basic and Translational Studies in Cancer, Bone Marrow, and Cardiovascular Biology

Laminin, CD34, DAPI

PRESENTED BY

Steven George
Professor and Chair
Department of Biomedical Engineering
University of California Davis

SCHEDULE

Thursday,
September 24, 2020
(10:00 AM-11:00AM)

Tissue engineering holds enormous potential to not only replace or restore function to a wide range of tissues, but also to capture and control 3D physiology in vitro (e.g., microphysiological systems or "organ-on-a-chip" technology). The latter has important applications in the fields of drug development, toxicity screening, modeling tumor metastasis (e.g. to the bone marrow), and repairing damaged cardiac (heart) muscle. In order to replicate the complex 3D arrangement of cells and extracellular matrix (ECM), new human microphysiological systems must be developed. The past decade has brought tremendous advances in our understanding of stem cell technology and microfabrication producing a rich environment to create an array of "organ-on-a-chip" designs. Over the past eight years we have developed novel microfluidic-based systems of 3D human microtissues (~ 1 mm3) that contain features such as perfused human microvessels, primary human cancer, human bone marrow, mouse tumor organoids, cardiomyocytes derived from induced pluripotent stem cells, and spatiotemporal control of oxygen. The technologies are part of two early start-up companies, Aracari Biosciences and Immunovalent Therapeutics, based in Irvine, CA and St. Louis, MO. This seminar will describe our core technologies and early results, including basic and translational studies in cancer, bone marrow, and cardiovascular biology.

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