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Biomedical Engineering

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10-30-20
10:30AM



ABSTRACT:

POWERING TUMOR CELL MIGRATION THROUGH HETEROGENEOUS MICROENVIRONMENTS

To move through tissues, cancer cells must navigate a complex, heterogeneous network of fibers in the extracellular matrix. This network of fibers also provides chemical, structural and mechanical cues to the resident cells. In this talk, I will describe my lab's efforts to understand the forces driving cell movements in the tumor microenvironment. Combining tissue engineering approaches, mouse models, and patient samples, we create and validate in vitro systems to understand how cells navigate the tumor stroma environment. Microfabrication and native biomaterials are used to build mimics of the paths created and taken by cells during metastasis. Using these platforms, we have described a role for a balance between cellular energetics, cell and matrix stiffness, and confinement in determining migration behavior. Moreover, we have extended this work into investigating the role of the mechanical microenvironment in tumor angiogenesis to show that mechanics guides vessel growth and integrity. I will discuss the mechanical influences at play during tumor progression and the underlying biological mechanisms driving angiogenesis and metastatic cell migration as a function of the ECM with an eye towards potential therapeutic avenues.

BIOGRAPHY:

Cynthia Reinhart-King is the Cornelius Vanderbilt Professor of Engineering and the Director of Graduate Studies in Biomedical Engineering. Prior to joining the Vanderbilt faculty in 2017, she was on the faculty of Cornell University where she received tenure in the Department of Biomedical Engineering. She obtained undergraduate degrees in chemical engineering and biology at MIT and her PhD at the University of Pennsylvania in the Department of Bioengineering. Her lab's research interests are in the areas of cell mechanics and cell migration specifically in the context of cancer and atherosclerosis. She was awarded the Rita Schaffer Young Investigator Award in 2010 and the Mid-Career Award in 2018 from the Biomedical Engineering Society, an NSF CAREER Award, the 2010 Sonny Yau '72 Excellence in Teaching Award, a Cook Award for "contributions towards improving the climate for women at Cornell," the Zellman Warhaft Commitment to Diversity Award from the Cornell College of Engineering, and the Vanderbilt Chancellor's Award for Research. She is a fellow of the Biomedical Engineering Society and the American Institute for Medical and Biological Engineering, and she is a New Voices Fellow of the National Academies of Science, Engineering and Medicine. She is currently a standing member of the NIH CMT study section panel and Secretary of the Biomedical Engineering Society.

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