

IEM SEMINAR SERIES

TUESDAY
December 6th, 2016

Force of the Dark Side: Biomechanics at the Tumor Microenvironment



Institute for
Engineering in Medicine

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Dr. Bumsoo Han

Professor of Mechanical and
Biomedical Engineering
Birck Nanotechnology Center
Purdue Center for Cancer Research



FREE event, no registration required.

Pizza and Beverages will be
provided from 11:45 am

12:00PM - 1:00PM

**Mayo Memorial
Building
Room 3-100**

For additional information on
Dr. Han's presentation
please contact:
scot0353@umn.edu

The Institute for Engineering in Medicine (IEM) is pleased to announce a seminar by Dr. Bumsoo Han, "Force of the Dark Side: Biomechanics at the Tumor Microenvironment."

The tumor microenvironment (TME) is a complex and chaotic bed for tumor growth. It comprises a highly heterogeneous mixture of tumor and stromal cells embedded in an extracellular matrix that also includes cytokines, growth factors, inflammatory cells and macrophages. Together, the TME poses multi-faceted barriers including biological, chemical and physical hindrances to drug transport and actions. These barriers are highly dynamic and often interconnected both biochemically and biomechanically. Their interactions and relative significance with respect to drug delivery and therapeutic efficacy vary drastically depending on the cancer type, stage and organs. The current difficulty in developing new anticancer drugs and drug delivery systems, including nanoparticle-based devices, primarily stems from the lack of a clear understanding of the delicate interplay of these barriers at the TME. In this talk, I will present my group's research to understand and manipulate these complex transport and biomechanical interfacial interactions with cells, interstitial fluid and extracellular matrix. Specifically, we have been developing a new in vitro tumor model, called "tumor-microenvironment-on-chip (T-MOC)." This T-MOC is capable of recapitulating several key biomechanical interactions at the TME to provide rapid and quantitative screening of drugs and drug delivery systems. This model system is further used to study cancer-stroma interaction during cancer metastasis including EMT, migration and extravasation of circulating cancer cells.

Bumsoo Han is a Professor of Mechanical and Biomedical Engineering at Purdue University. He is also B.S.F. Schaefer Outstanding Young Faculty Scholar and Discovery Park Fellow at Birck Nanotechnology Center. He serves as Co-Leader of Drug Delivery and Molecular Sensing Program of NCI-designated Purdue Center for Cancer Research. He received his Ph.D. in Mechanical Engineering from the University of Minnesota, and his M.S. and B.S. from Seoul National University in Korea. After his Ph.D., he was a Post-doctoral Research Associate in Mechanical and Biomedical Engineering at the University of Minnesota. His broad research interests are in biotransport phenomena. His current research focuses on the quantitative understanding and engineering of biotransport phenomena for cancer therapy. He received US DOD Postdoctoral Award for Breast Cancer Research, NSF CAREER Award, Faculty Fellowship from US Air Force Research Laboratory (Predictive Toxicology Program), and Richard Skalak Best Paper Award from ASME Journal of Biomechanical Engineering. Recently, he is the recipient of Faculty of Excellence Early Career Research Award from Purdue University, and Brain Pool Korea Fellowship from Ministry of Science of South Korea.

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