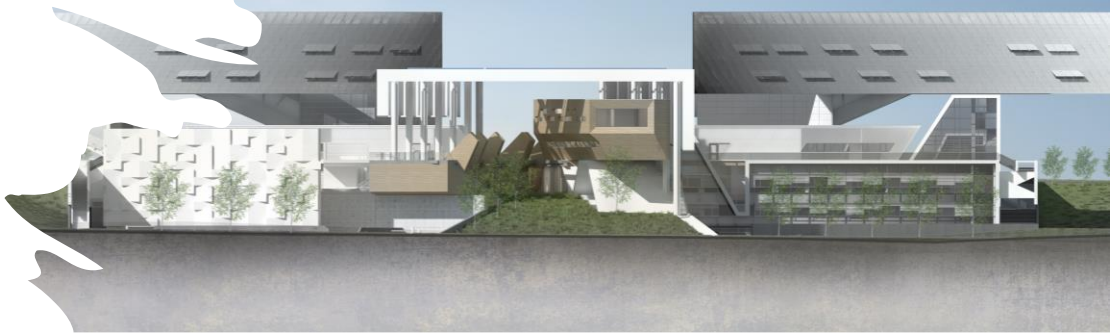
The Role Of Mechanical Forces
In Tumor Growth And Therapy

Dr. Triantafyllos Stylianopoulos

Wednesday, 17 March 2021 11:00 -12:30

To attend the seminar, click **here**



A solid tumor is an aberrant tissue made of cancer cells and a variety of host cells—all embedded in an extracellular matrix—nourished by blood vessels and drained by lymphatic vessels. Solid tumors often stiffen as they grow in a host's normal tissue. Stiffening, which is perhaps the only mechanical aspect of a tumor that clinicians and patients can feel/sense, is caused by an increase in the structural components of the tumor, particularly in the amount of cancer cells, stromal cells, and collagen. Tissue stiffening along with the growth of the tumors within the confined space of the host tissue result in the generation of mechanical forces. When exerted directly on cancer cells, these forces can increase their invasive and metastatic potential. Mechanical forces are also able to compress blood and lymphatic tumor vessels, reducing drastically perfusion rates and creating hypoxia. Hypo-perfusion and hypoxia in turn contribute to immune-evasion, promote malignant progression and metastasis, and reduce the efficacy of a number of cancer therapies. Taming intratumoral mechanical forces can improve therapeutic outcomes in many cancers. In my talk, I will present a series of *in vivo*, *in vitro* and *in silico* studies that demonstrate the importance of mechanics in tumor progression and how modulation of the mechanical properties of tumors can result in improved treatments.

Bio-sketch

Triantafyllos Stylianopoulos is an Associate Professor at the Department of Mechanical and Manufacturing Engineering and the Head of the Cancer Biophysics Laboratory at the University of Cyprus. He received a Diploma in Chemical Engineering from National Technical University of Athens, Greece (2003) and a PhD also in Chemical Engineering with a focus on Multiscale Computational Biomechanics from the University of Minnesota (2008). During his postdoctoral training at the Massachusetts General Hospital and Harvard Medical School, he was specialized in experimental Cancer Research for the enhancement of drug delivery to solid tumors (2008-2010). Triantafyllos has published more than 110 articles in peer reviewed journals in the fields of tumor microenvironment, drug delivery and biomechanics. He has secured > €6.0M in research funding as a Principal Investigator, including two frontier grants by the European Research Council (ERC) that supports academic excellence in Europe: an ERC Starting Grant (ReEngineeringCancer, 2014-2018) and an ERC Consolidator Grant (Immuno-Predictor, 2020-2025). In 2016, he was awarded the Y.C. Fung Early Career Award by the Bioengineering Division of the American Society of Mechanical Engineers. He was also the recipient of the Most Cited article award (2014) and the Athanasiou ABME student award (2019) by the Biomedical Engineering Society of the USA for articles published in Annals of Biomedical Engineering.

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