Abstract

"Chemistry and Physics; the effect of drugs and microstructures on cells"

Engineering cells through application of physical stimuli, such as strain, substrate geometry, electrical conductivity, exotic cell substrates or other constraints, has attracted considerable interest across diverse scientific disciplines, including biophysics, materials science, biochemistry, tissue engineering, regenerative medicine, pharmaceutics, and medicine. The emergence of nano/microfabrication technology and epigenetics has further enhanced the appeal of this engineering approach, making it one of the most actively studied areas in the field. A vast number of man-made nano/microstructures or exotic (from a cell biology viewpoint) substrates have been tested with a variety of animal or plant cells, and their effects have been analyzed. In this talk, I will present various examples of cell-interfacing efforts on going in our group. We investigated the metastatic potential of A549 human lung adenocarcinoma cells grown on 10-cm petri dishes with 2-μm diameter, 16-μm, pitched pillar arrays. The effect of ZnO substrates on various cell lines will be presented as well, and finally, I will show the transparent, hybrid graphene-vertically aligned carbon electrode interfaced with neuronal cells.