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Development of microfabricated tools to investigate immune cell-tumor cell interactions

Meltem Elitas, Sahl Sadeghi and Yelda Birinci
Sabanci University, Turkey

Understanding the interactions between tumor cells and immune cells in a quantitative manner will provide valuable information to reveal the mechanism of diseases, immune defense and development of new treatment reagents and strategies for the diseases. Today one of the biggest limitations relies on the traditional methods and tools that we use to investigate the rare cells and specific events in biology particularly in immunology. Since these techniques are not adequate enough to be selective, specific and quantitative, the rare cells such as the metastatic or drug resistant ones or the events such as onset symptoms of tumors and infections are being masked by majority of the cells or events in the population. Therefore, we cannot diagnosis on time or provide successful strategies. As a consequence, our approaches might not target the right cells at the right time in the right place. To overcome these limitations, we might profit from engineering approaches and tools. We can develop quantitative, accurate, reproducible and precise methods and use microfabricated tools to understand the nature and behavior of rare cells and events. The improvements from microfabricated tools in conjunction with microscopy might provide statistics from large numbers of single cells, short assay time, less sample consumption, less waste production, quantitative and reproducible data, single-cell resolution images, high-throughput, spatio-temporal tracking and real-time assays, etc. This talk will present recently developed microfabricated tools to understand the immune cell-tumor cell interactions. I will present our microfluidic applications and their preliminary data from my research group.

Biography

Meltem Elitas is a Faculty Member in Mechatronics Program at Sabanci University. Her background is in Electrical and Mechatronics Engineering. She has obtained her Doctorate from Bioengineering and Biotechnology Department at Ecole Polytechnique Federale de Lausanne. She has performed her Postdoctoral studies at Yale University Biomedical Engineering Department. She has published more than 25 papers in reputed journals. Her research interests are biomechanics, cellular heterogeneity, cellular interactions, tumor microenvironment, live cell imaging and development of microfabricated tools for quantitative biology.

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