



BME PARIS
BioMedical Engineering
MASTER'S PROGRAM

Good cells killing bad cells

Open Your Mind Seminar

Friday, Nov 10 2023
1.30 pm – 3.00 pm

Amphitheater BÉZIER
Arts et Métiers Institute of Technology
155 boulevard de l'Hôpital, 75013 Paris

Modeling immune-cancer interactions using a microfluidic 3D culture approach

Cancer immunotherapy is emerging as a transformative approach for treating cancer patients. This approach, which has shown some remarkable successes, leverages the patient's own immune cells to locate and attack the tumor cells. However the method suffers from large heterogeneities in outcomes between different patients, in part due to the the number, phenotype, and distribution of cytotoxic T cells (CTLs) around the tumor cells. For this reason decoding the collective behavior of CTLs, as they recognize and attack cancer cells, is a major challenge that requires advanced in vitro models. This seminar will present a microfluidic platform that enables quantitative measurements of the spatiotemporal dynamics of individual CTLs as they migrate in three-dimensional (3D) environments and attack cancer spheroids. The method provides access to the trajectories of thousands of cells around hundreds of spheroids, which in turn enables probabilistic modeling of the trajectories. Analysis of the migration and killing events allows us to dissect the different phases of interactions and to identify limiting steps for different conditions. The talk will present the microfluidics and then shift focus to different biological models, with implications for both fundamental biology and for personalized medicine.

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