



Centre for Biosystems Science and Engineering

SEMINAR

at 11:00 AM on March 14, 2017

MRDG Seminar Hall

Good touch and bad touch: Direct immune cell-cell contacts in immune response and metastasis

Dr. Sudha Kumari

Postdoctoral Associate, MIT, Cambridge

Efficient cellular communication is a fundamental demand of an effective immune response, where direct cell-cell contacts mediate the majority of the immune cellular recognition events. Such transient cellular junctions, classically termed 'immunological synapses', are unique to immune cells. Synapse duration and strength are critical determinants of the quality and magnitude of the subsequent immune response. While the biochemical tool parts required to engage successful immunological synapse are substantially well – characterized; mechanistically how these components orchestrate the lifetime and mechanics of immune cell contacts remains unclear. We investigated this problem using primary T cells as model cells, and a combination of interdisciplinary techniques including genetic perturbations, in vitro cellular mimetic surfaces and high-resolution microscopy. Our results uncovered a novel cytoskeletal pathway that mechanically tunes cell-cell contact stability in T cells. Loss of this cytoskeletal pathway results in short lived synapses, poor T cell immune response and is associated with an immunodeficiency disease in humans. Furthermore, we find that the aforementioned cytoskeletal mechanism for modulating contact lifetime is not unique to T cells. A variation of the same mechanism could also be utilized during the immune cell-tumor cell interactions during tumor metastasis, and could restrain the success of tumor cell metastatic seeding into distant organs.

In my talk, I will discuss the aforementioned cytoskeletal mechanism that modulates immune cell contact lifetime, using the two above mentioned case studies: T cell immunological synapse and tumor-granulocyte aggregation in blood during metastasis. I will also briefly outline the development of an optical clearing technique, that enables sensitive and high resolution imaging of immune cell contacts in their native environment, deep within the intact organs

About the speaker:

Dr. Sudha Kumari is currently an Postdoctoral Associate, MIT, Cambridge. Dr. Sudha working towards understanding the anatomy of 'immune cell contacts' at a cellular level, and their alterations in pathologies, using a combination of interdisciplinary tools. Prior to this, she worked as postdoctoral fellow in Dustin laboratory at the NYU School of Medicine, studying signaling molecules compartmentalization in T cells. She finished her PhD from National center for Biological Sciences working with Professor Satyajit Mayor.