Photoswtichable ICAM1 for immunological synapse studies

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The immunological synapse is formed as a result of tight apposition of Antigen Presenting Cells and Lymphocytes such as T-cells. This structure is a complex assembly of spatially organized concentric rings of multiple proteins.[1] The functional role of molecular clustering in the center of immunological synapse is debatable. It is essential for immune response functions such as activation of T-cells and secretion of cytokines and lytic granules leading to death of the APC. Numerous reports have shown that spatio-temporal organization of ligands along with the APC's mechanical properties are vital for the IS to form and function effectively.[2]

I will present our work where we established mechanically tunable 2D hydrogels on which dynamically light activatable ligands are anchored. We designed light responsive Intracellular Cell Adhesion Molecule 1, which is an APC transmembrane protein and is essential for early adhesion of a T-cell to an APC, following which the IS forms through multiple steps. For making it light responsive, we fused Light-Oxygen-Voltage domain from Avena Sativa to the N-terminus of extracellular domain 1 of ICAM.[3]

References:

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