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Spatial coordination in memrane proximal signaling in T-cells MAXIM N. ARTYOMOV, MIESZKO LIS, ARUP CHAKRABORTY, Massachusetts Institute of Technology — Membrane-proximal signaling initiates signaling networks of the T-cell which ultimately lead to the T-cell activation. Signal formation requires assembly of the several membrane proteins and successful cooperative interactions inside the complex. Diffusion and chemical reactions involved in the process are characterized by substantially different timescales. In this work we consider how the reaction-diffusion system described by the wide spectrum of timescales can be selective for the minute amounts of the signal (cognate peptide-MHC complex) over the large amounts of irrelevant targets (non-cognate peptide-MHC complex). Note that single distinction between relevant and irrelevant targets - the affinity to the T-cell receptor, is nonetheless sufficient to discriminate between two groups of targets. Moreover, proposed mechanism allows for signal cooperativity with non-cognate peptides amplifying the signal from cognate ones even though they can not signal by themselves. This kind of cooperativity has been observed in recent experiments.

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