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**Modeling Signal Transduction and Lipid Rafts in Immune Cells**

ASHOK PRASAD, Dept. of Chemical and Biological Engr, Colorado State University — Experimental evidence increasingly suggests that lipid rafts are nanometer sized cholesterol dependent dynamic assemblies enriched in sphingolipids and associated proteins. Lipid rafts are dynamic structures that break-up and reform on a relatively short time-scale, and are believed to facilitate the interactions of raft-associated proteins. The role of these rafts in signaling has been controversial, partly due to controversies regarding the existence and nature of the rafts themselves. Experimental evidence has indicated that in several cell types, especially T cells, rafts do influence signal transduction and T cell activation. Given the emerging consensus on the biophysical character of lipid rafts, the question can be asked as to what roles they possibly play in signal transduction. Here we carry out simulations of minimal models of the signal transduction network that regulates Src-family kinase dynamics in T cells and other cell types. By separately treating raft-based biochemical interactions, we find that rafts can indeed putatively play an important role in signal transduction, and in particular may affect the sensitivity of signal transduction. This illuminates possible functional consequences of membrane heterogeneities on signal transduction and points towards mechanisms for spatial control of signaling by cells.

Ashok Prasad
Dept. of Chemical and Biological Engr, Colorado State University

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