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Regulating the Size and Stabilization of Lipid Raft-Like Domains and Using Calcium Ions as Their Probe URI RAVIV, OR SZEKELY, The Hebrew University of Jerusalem — In this paper, we apply means to probe, stabilize and control the size of lipid raft-like domains in vitro. In biomembranes the size of lipid rafts is ca. 10 - 30 nm. In vitro, mixing saturated and unsaturated lipids results in micro-domains, which are unstable and coalesce. Using solution X-ray scattering, we studied the structure of binary and ternary lipid mixtures in the presence of calcium ions. Three lipids were used: saturated, unsaturated and a hybrid (1-saturated-2-unsaturated) lipid that is predominant in the phospholipids of cellular membranes. Only membranes composed of the saturated lipid can adsorb calcium ions, become charged and therefore considerably swell. The selective calcium affinity was used to show that binary mixtures, containing the saturated lipid, phase separated into large-scale domains. Our data suggests that by introducing the hybrid lipid to a mixture of the saturated and unsaturated lipids, the size of the domains decreased with the concentration of the hybrid lipid, until the three lipids could completely mix. We attribute this behavior to the tendency of the hybrid lipid to act as a line-active co-surfactant that can easily reside at the interface between the saturated and the unsaturated lipids and reduce the line-tension between them.

Uri Raviv
The Hebrew University of Jerusalem

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