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MEMBRANE DOMAINS OF EUKARYOTIC AND PROKARYOTIC CELLS: THEIR ROLE IN SIGNAL TRANSDUCTION

Summary

The plasma membrane of eukaryotic cells contains domains named rafts which are nonscale dynamic assemblies of sphingolipids, cholesterol and selected proteins, mainly palmitoylated ones. During stimulation of distinct immune receptors labile rafts merge into larger structures which are stabilized by submembraneous cytoskeleton and serve as signaling platforms of those receptors. Paradoxically, rafts are also utilized by some viruses and bacteria to invade/escape host cells. On the other hand, bacterial plasma membrane contains domains accommodating sensory proteins and several other enzymes which suggests that those domains are sites of signal transduction. Lipid composition of bacterial membrane domains is poorly characterized and a role in their formation is ascribed to proteins named flotillins. Thus, domain organization of the plasma membrane seems to be common to eukaryotic and prokaryotic cells. It facilitates spatial organization of plasma membrane receptors as well as lipids and proteins involved in their signaling pathways. During evolution rafts of the plasma membrane have become important especially for functioning of human and animal immune cells.

Key words: cholesterol, flotillin, plasma membrane, rafts, sphingolipids