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The notion that cellular membranes contain distinct microdomains, acting as scaffolds for signal transduction processes, has gained considerable momentum. In particular, a class of such domains that is rich in sphingolipids and cholesterol, termed as lipid rafts, is thought to compartmentalize the plasma membrane, and to have important roles in survival and cell death signaling in mammalian cells. Likewise, yeast lipid rafts are membrane domains enriched in sphingolipids and ergosterol, the yeast counterpart of mammalian cholesterol. Sterol-rich membrane domains have been identified in several fungal species, including the budding yeast Saccharomyces cerevisiae, the fission yeast Schizosaccharomyces pombe as well as the pathogens Candida albicans and Cryptococcus neoformans. Yeast rafts have been mainly involved in membrane trafficking, but increasing evidence implicates rafts in a wide range of additional cellular processes. Yeast lipid rafts house biologically important proteins involved in the proper function of yeast, such as proteins that control Na(+), K(+), and pH homeostasis, which influence many cellular processes, including cell growth and death. Membrane raft constituents affect drug susceptibility, and drugs interacting with sterols alter raft composition and membrane integrity, leading to yeast cell death. Because of the genetic tractability of yeast, analysis of yeast rafts could be an excellent model to approach unanswered questions of mammalian raft biology, and to understand the role of lipid rafts in the regulation of cell death and survival in human cells. A better insight in raft biology might lead to envisage new raft-mediated approaches to the treatment of human diseases where regulation of cell death and survival is critical, such as cancer and neurodegenerative diseases.

KEYWORDS:

S. cerevisiae, cell death, ergosterol, ion homeostasis, lipid rafts, membrane domains, nutrient transporters, yeast