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Part I

Membrane lipids are important regulators of basic cellular processes, such as cellular uptake and intracellular transport. Lysophospholipids (LPLs) are components of cellular membranes and bioactive molecules circulating in physiological fluids, and are implicated in both physiological and pathophysiologal processes. LPLs can regulate cellular events by activating specific receptors at the cell surface and also by mechanically modifying the plasma membrane. In this study, Ailte and colleagues have investigated how exogenously added LPLs affect essential cellular processes, such as ligand binding and clathrin-mediated endocytosis. Data show that incorporation of LPLs in the plasma membrane alters the physicochemical properties of the membrane and regulates cellular processes in a lipid-shape dependent manner, with lipids comprising a large head group and a saturated fatty acyl tail being the most potent regulators (e.g. lysophosphatidylinositol). This work reveals a novel role of LPLs in several cellular processes and extends our knowledge of the fundamental role of lipids in cell biology.

Part II

The cellular chaperone Heat shock protein of 90 kDa (Hsp90) stabilizes a variety of proteins, including proteins required for survival of cancer cells. Targeting of Hsp90 by various drugs, such as geldanamycin, its derivatives, and radicicol have been tested in clinical trials for several cancers, but only some show clinical efficacy. During environmental stress, Hsp90 supports the folding and stabilization of cellular proteins important for cell cycle progression and cell division. At normal growth conditions, Hsp90 inhibition has been reported to target components of vesicle-mediated transport and Golgi apparatus. The bacterial toxin Shiga toxin (Stx) hijacks the cellular machinery and uses the retrograde transport pathway to intoxicate cells. Ailte and colleagues have investigated how inhibition of Hsp90 by geldanamycin affects the intracellular transport by following the uptake and retrograde transport of a non-toxic Stx variant. Data show that inhibition of Hsp90 strongly increases Stx transport to the Golgi apparatus, and the increase is at least partially regulated by activation of the MAPK p38 signalling pathway. This work expands our understanding of Hsp90 as a regulator of vesicular trafficking. Vesicular trafficking is essential to sustain healthy cell life, and knowing how it is regulated will help to treat diseases associated with impaired trafficking.