

Phospholipase A₂ Promotes Raft Budding and Fission from Model Vesicles Mimicking Cell Plasma Membranes

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Abstract. Endocytosis, formation of caveolae and caveosomes, as well as Golgi membranes traffic have been linked to the existence and dynamics of particular types of lipid/protein membrane domains, enriched in sphingolipids and cholesterol, called rafts. In addition, the participation of phospholipases in the vesiculation of Golgi and other membranes has been already established essentially in their role in the production of second messenger molecules. In this work we illustrate with raft-containing giant lipid vesicles a mechanism for raft-vesicle expulsion from the membrane due to the activity of a single enzyme-phospholipase A₂ (PLA₂). This leads to the hypothesis that the PLA₂, apart from its role in second messenger generation, might play a direct and general role in the vesiculation processes underlying the intermembrane transport of rafts through purely physicochemical mechanisms. These mechanisms would be: enzyme adsorption leading to membrane curvature generation (budding), and enzyme activity modulation of the line tension at the raft boundaries, which induces vesicle fission.

Financial support from the National Science Fund, Bulgaria (Grant number DFNI B 02/23/2014), is gratefully acknowledged.