Experimental Investigation of PIP2-ERM proteins Interactions

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The plasma membrane is a complex object of adaptive design, especially at the cytoskeleton interface where a wide variety of cellular processes take place. Surprisingly, phosphatidylinositol biphosphare (PIP2) a minor component in the plasma membrane, is involved in a large number of these processes. PIP2 plays a ubiquitous role in intracellular signaling cascades, trafficking and cytoskeleton dynamics. We investigate in vitro the interaction of PIP2 with cytoplasmic proteins involved in such processes. We focus on the ERM (Ezrin Radixin Moesin) protein family which acts as a crosslinker between the actin network and the plasma membrane. ERM proteins have been shown to exist in a dormant conformation in the cytoplasm and in an active state, for which, the N-terminal FERM domain binds to the plasma membrane through its interaction with PIP2, and the C-terminal region binds to actin filaments. We study the interactions between ERM proteins and PIP2 using PIP2-containing unilamellar vesicles and PIP2 unimolecular dispersions. We show in particular the specificity of PIP2 for inducing the conformational transition of wild-type Ezrin and find that PIP2 induces the formation of wild-type Ezrin multimer.

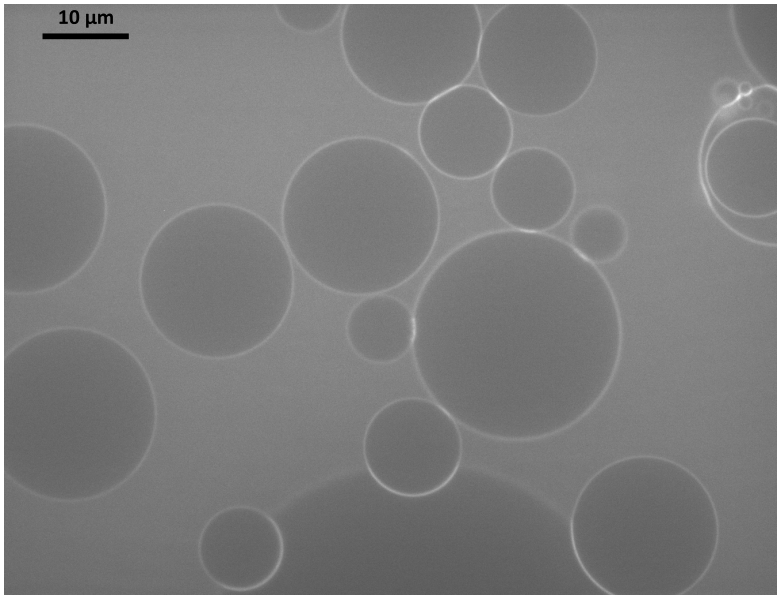

Fig. 1: Interaction of fluorescently-labeled Ezrin with PIP2-containing giant unilamellar vesicles