In Vivo Evidence For the GTPase Facilitated Mechanical Role of Dynamin in Vesicle Fission

Exocytosis of synaptic vesicles is rapidly followed by compensatory plasma membrane endocytosis. The efficiency of endocytosis has been shown to vary with experimental conditions, but the molecular basis for its control remains poorly understood. The function of GTPase dynamin has been implicated in vesicle fission by means of electron microscopy, *in vitro* lipid tube imaging, FM dye, and postsynaptic electrophysiological experiments. Though these experiments provide an appreciation for dynamin's endocytic role, they do not implicate specific knowledge of dynamin's dynamic function in endocytosis. Here, by means of cell-attached capacitance electrophysiology, real-time illustrations of membranous area dynamics were utilized to functionally discern the role of dynamin in endocytosis. Dynasore, a well-known membrane permeable dynamin GTPase inhibitor, was used to disrupt dynamin GTPase activity. Thusly, a 73% increase in endocytic duration induced by dynasore treatment was observed of the already retarded number of endocytic events recorded—a near three-fold decrease. A 95% increase in the fission-pore conductance, which is determined by the fission-pore geometry, is observed in cells treated with dynasore. Our data provides the first piece of *in vivo* evidence for the mechanical role of dynamin in vesicle fission.