REGIONAL CENTRE FOR BIOTECHNOLOGY

Journal Club

"A dynamin 1-, dynamin 3- and clathrin-independent pathway of synaptic vesicle recycling mediated by bulk endocytosis "
eLife, 2014;3:e01621; 1-26

Sivaram V S Mylavarapu, PhD

Wednesday, 6th Aug 2014, 4.00 PM
ATPC Seminar room

Abstract

The exocytosis of synaptic vesicles (SVs) elicited by potent stimulation is rapidly compensated by bulk endocytosis of SV membranes leading to large endocytic vacuoles (‘bulk’ endosomes). Subsequently, these vacuoles disappear in parallel with the reappearance of new SVs. We have used synapses of dynamin 1 and 3 double knock-out neurons, where clathrin-mediated endocytosis (CME) is dramatically impaired, to gain insight into the poorly understood mechanisms underlying this process. Massive formation of bulk endosomes was not defective, but rather enhanced, in the absence of dynamin 1 and 3. The subsequent conversion of bulk endosomes into SVs was not accompanied by the accumulation of clathrin coated buds on their surface and this process proceeded even after further clathrin knock-down, suggesting its independence of clathrin. These findings support the existence of a pathway for SV reformation that bypasses the requirement for clathrin and dynamin 1/3 and that operates during intense synaptic activity.