Regulation of membrane scission in yeast endocytosis

During Clathrin-mediated endocytosis, a flat plasma membrane is transformed into invaginations that eventually form vesicles. In mammalian cells, the transition from invagination to vesicle is driven by the GTPase dynamin in collaboration with BAR domain proteins. In yeast cells, although the BAR domain protein complex Rvs is implicated, what causes scission remains unclear. We used quantitative live-cell imaging and genetic manipulation to understand the recruitment and function Rvs and other potential scission effectors.

We found that arrival of Rvs is timed by interaction of its BAR domain with membrane curvature. A second domain of Rvs167- the SH3 domain- affects localization efficiency of Rvs. Removal of the SH3 domain also affects actin assembly/ disassembly and membrane invagination. We show that the yeast Myosin Myo3 has a role in recruiting Rvs167 via this domain. Our results indicate that both BAR and SH3 domains are important for the role of Rvs in scission. We found that neither synaptojanins nor dynamin contribute directly to scission. We propose that recruitment of Rvs BAR domains delays scission and allows invaginations to grow by stabilizing them. We also propose that vesicle formation is dependent on the force exerted by the actin network component of the endocytic machinery.