C. elegans Dynamin mediates the signaling of phagocytic receptor CED-1 for the engulfment and degradation of apoptotic cells.

Abstract

Dynamins are large GTPases that act in multiple vesicular trafficking events. We identified 14 loss-of-function alleles of the C. elegans dynamin gene, dyn-1, that are defective in the removal of apoptotic cells. dyn-1 functions in engulfing cells to control the internalization and degradation of apoptotic cells. dyn-1 acts in the genetic pathway composed of ced-7 (ABC transporter), ced-1 (phagocytic receptor), and ced-6 (CED-1's adaptor). DYN-1 transiently accumulates to the surface of pseudopods in a manner dependent on ced-1, ced-6, and ced-7, but not on ced-5, ced-10, or ced-12. Abnormal vesicle structures accumulate in engulfing cells upon dyn-1 inactivation. dyn-1 and ced-1 mutations block the recruitment of intracellular vesicles to pseudopods and phagosomes. We propose that DYN-1 mediates the signaling of the CED-1 pathway by organizing an intracellular vesicle pool and promoting vesicle delivery to phagocytic cups and phagosomes to support pseudopod extension and apoptotic cell degradation.