Abstract

Enzymatic roles of kinases and phosphatases in almost every aspect of cellular life are well described in a wide variety of examples. Lately the role of the same proteins independent of their catalytic activity is being increasingly appreciated. In this work, we focus on two proteins, mammalian MTMR9, and *Caenorhabditis elegans* SEL-5/AAK1. MTMR9 belongs to the myotubularin-related family of lipid phosphatases (MTMR) and is known to be a pseudophosphatase, a catalytically inactive member of the MTMR group. SEL-5/AAK1, on the other hand, is characterized by its kinase activity with at least two putative substrates identified so far. We described the localization of MTMR9 to early secretory pathway and its colocalization with known ER-to-GA compartment (ERGIC) markers. We also identified several possible MTMR9-interacting partners, such as RAB1 and MTMR6, whose localization and/or activity could be potentially regulated by MTMR9 binding. Disruption of proper MTMR9 levels led to an alteration in WNT3A secretion and subsequently to a reduced activity of the Wnt signaling pathway. Similarly, we identified SEL-5/AAK1 role in two separate Wnt-regulated developmental processes in *C. elegans*. Firstly, SEL-5 along with other members of the retromer complex regulate a proper QL.d migration. Secondly, excretory cell canals depended on SEL-5 for their ability to grow to their full length. Interestingly, whereas SEL-5 does seem to phosphorylate the AP2 complex μ2 subunit, we found that its kinase activity is dispensable for both QL.d and excretory canals regulation.