CDC12 is an essential gene that encodes a septin. Septins are a family of conserved proteins first identified in yeast and subsequently found in numerous other fungi and animals, including human, mouse, Drosophila, and C. elegans. Septins are required for cytokinesis in many species; four yeast septin genes, CDC3, CDC10, CDC11, and CDC12, were identified through temperature-sensitive mutations that cause defects in cytokinesis. These yeast septins also function in axial bud site selectionand morphogenesis; they are required for the correct localization of several other proteins involved in cytokinesis, morphogenesis, and bud site selection. The yeast septins localize to a ring around the bud neck, and form a highly ordered filament structure. Mutations in CDC3, CDC10, CDC11 , or CDC12 disrupt the filaments, but cytokinesis can still proceed in the cdc10 deletion, suggesting that the filament structure is not necessary for this aspect of septin function. Cdc3p, Cdc10p, Cdc11p, and Cdc12p physically interact with three mitosis-specific protein kinases, Gin4p, Hsl1p and Kcc4p, which are involved in cell cycle progression. The septins are required for the localization and activation of these protein kinases. All known septins contain consensus GTP-binding domains, and Drosophila septins hydrolyze GTP in vitro. Septin GTPase activity has not been studied extensively in yeast. Three more genes encoding septins, SHS1, SPR3, and SPR28, have been identified more recently and are less well characterized than the first four yeast septins.