CDC42 is an essential gene that encodes a small GTPase in the Rho/Rac subfamily of Ras-like GTPases. Other S. cerevisiae Rho GTPases are encoded by RHO1, RHO2, RHO3, RHO4, and RHO5. Like other eukaryotic Rho-type GTPases, Cdc42p is involved in the establishment of cell polarity; its downstream effects include reorganization of the actin cytoskeleton and protein kinase-dependent induction of transcription. Cdc42p is localized to the plasma membrane at sites of growth such as incipient bud sites, bud tips, the bud neck during cytokinesis, and shmoo tips of mating cells. At the restrictive temperature, temperature-sensitive cdc42 mutants fail to bud but continue to grow, and then arrest as large, unbudded cells. The GTPase activity of Cdc42p is stimulated by the GTPase activating proteinsBem3p, Rga1p, and Rga2p. Once GTP is hydrolyzed, a guanine nucleotide exchange factorpromotes the exchange of GDP for GTP.