In S. cerevisiae, TUB2 encodes the single essential beta-tubulin. Tub2p belongs to the tubulin superfamily, which includes alpha- and gamma-tubulin and the prokaryotic tubulin-like gene FtsZ. Beta- and alpha-tubulin form tubulin heterodimers, which polymerize into microtubules. Microtubules are conserved cytoskeletal elements that function in nuclear processes: chromosome segregation in mitosis and meiosis, spindle orientation, and nuclear migration during mitosis and mating. All microtubules in S. cerevisiae emanate from a microtubule organizing center called the spindle pole body, which is embedded in the nuclear envelope. Microtubules extend from both faces of the SPB, generating two types of microtubules: nuclear and cytoplasmic microtubules. The distribution and length of these two types of microtubules is regulated throughout the cell cycle. TUB2 was cloned based on its strong homology with its counterparts in other eukaryotes. There is an abundance of tub2 conditional mutants resulting from genetic screens for chromosome loss and sensitivity/resistance to anti-microtubule drugs, suppressor analysis, and in vitro mutagenesis. One benomyl-resistant allele of TUB2, tub2-150, actually requires benomyl for growth at high temperatures, suggesting that microtubules in this mutant are hyper-stable. Most conditional tub2 mutants are cold sensitive, presumably reflecting the intrinsic cold-sensitivity of the microtubule polymer. Tub2p interacts with numerous proteins involved in the regulation of microtubules, such as microtubule motors, SPB components, kinetochore components, tubulin biogenesis factors, and alpha-tubulin. Tub2p is a GTP-binding protein. Tub2p hydrolyzes its GTP following tubulin dimer addition to the microtubule end, whereas the GTP bound to Tub1p and Tub3p is non-hydrolyzable. The structure of tubulin has been crystallized in the polymerized state; Tub3p and Tub1p, rather than Tub2p, are believed to interact directly with the SPB.