STE4 encodes the beta subunit of the heterotrimeric G protein involved in the mating pathway. Yeast respond to mating pheromone by transducing the pheromone signal through a well-studied mitogen-activated protein kinasecascade. The first step in the mating pathway is the binding of mating pheromone to its receptor; the pheromone receptors are encoded by STE2 in MATa cells and STE3 in MATalpha cells. These receptors transmit their signals through a heterotrimeric G protein consisting of Gpa1p, the G-alpha subunit, Ste4p, the beta subunit, and Ste18p, the gamma subunit. After binding pheromone, the pheromone receptor undergoes a conformational change and there is an exchange of GDP for GTP on Gpa1p. In its GTP-bound form, Gpa1p has less affinity for the Ste4p-Ste18pcomplex, and the latter is released and able to activate downstream components of the pheromone response pathway. The beta-gamma complex binds to both the scaffolding protein Ste5p, facilitating recruitment of Ste5p and its associated kinasesto the plasma membrane, and to the PAK kinase Ste20p. The Ste4p-Ste18p dimer also interacts with a complex of Far1p and Cdc24p; in total, these interactions induce expression of genes involved in mating, polarization of cell growth, and ultimately cell and nuclear fusion. ste4 null mutants do not accumulate Ste18p to normal levels, and Ste4p is not localized to the plasma membrane in ste18 null mutants, indicating that beta-gamma dimer formation is required for function. Ste4p is rapidly phosphorylated upon addition of pheromone to cells; it appears that this modification does not affect Ste4p's function in pheromone signaling.