PLP2 is one of two S. cerevisiae genes encoding proteins similar to mammalian phosducins. Phosducins inhibit the GTPase activity of several heterotrimeric G proteins, presumably as a consequence of binding to the beta-gamma subunits of the G proteins. Plp2p is essential for viability, but the other phosducin-related protein, Plp1p, is not. In yeast, a heterotrimeric G protein comprising Gpa1p, Ste4p, and Ste18p transduces the mating pheromone signal. Both Plp1p and Plp2p bind to the yeast G beta-gamma complex, suggesting that they may play a role in mating pheromone signal transduction. Overexpression of PLP1 or PLP2 reduces pheromone-responsive transcriptional activation, but has no effect on pheromone induced growth arrest. Deletion of STE7, which encodes a MAP kinase kinase involved in pheromone signal transduction downstream of the heterotrimeric G proteindoes not rescue the plp2 null mutant, suggesting that Plp2p may have an essential role in a process other than mating.