The signal recognition particleis an abundant and conserved ribonucleoprotein necessary for targeting proteins to the endoplasmic reticulum membrane. SRP in eukaryotes contains six subunits and a 7S RNA molecule; in S. cerevisiae the subunits are encoded by SRP14, SRP21, SRP68, SRP72, SEC65, and SRP54, and the RNAis encoded by SCR1. With the exception of Srp54p, the proteins and RNA assemble into a core complex in the nucleus; this particle is exported to the cytoplasm where Srp54p joins to form the complete complex. Sec65p is required for association of Srp54p with the SRP particle. Loss of any of the SRP components causes a slow growth phenotype and loss of SRP-mediated translocation, but not cell death, indicating that the signal recognition particle is not essential in yeast and SRP-independent translocation can occur. The first step of SRP-mediated cotranslational targeting is interaction between SRP and the ribosome nascent chain complex, which is comprised of the translating ribosome and the emerging nascent protein. SRP interacts with the RNC through the N-terminal hydrophobic signal sequence of the nascent protein. SRP then directs the RNC to the ER membrane via interaction between SRP and a signal receptor complex, encoded by SRP101 and SRP102. Finally, the RNC is transferred to the translocon, a protein-conducting membrane channel, and SRP and the SR dissociate. GTP binding by both SRPand the SR is critical for their interaction, and GTP hydrolysis facilitates their dissociation.