About mitochondrial importWhile the mitochondrial genome encodes a handful of proteins, most of the hundreds of proteins that reside in the mitochondrion are encoded by nuclear genes, translated in the cytoplasm, and imported into mitochondria via a series of complex molecular machines. Many of the proteins imported into mitochondria are involved in respiration, which is not an essential process: S. cerevisiae is able to carry out either fermentative growth on carbon sources such as glucose, or respiratory growth on nonfermentable carbon sources such as glycerol and ethanol. However, since maintenance of the mitochondrial compartment is essential to life, mutations that completely disrupt mitochondrial import are lethal.About the TIM22 complex The TIM22 complex of the mitochondrial inner membrane mediates the insertion of large hydrophobic proteins, typically transporterswith multiple transmembrane segments, into the inner membrane. These proteins travel through the outer membrane via the translocase of the outer mitochondrial membranecomplex. Their transit across the intermembrane space to the TIM22 complex in the inner membrane is mediated by complexes of small soluble protein chaperones: Tim8p with Tim13p, and Tim9p with Tim10p. The membrane-embedded core of the TIM22 complex consists of Tim54p, Tim22p, Tim18p, and Sdh3p; additionally, the small Tim proteins Tim9p, Tim10p, and Tim12p are associated with the complex on the intermembrane space side.about TIM18 Tim18p is a nonessential, but integral, component of the TIM22 complex. Its role in the complex is unclear, but it is thought to facilitate assembly of Tim54p into the complex.The protein is embedded in the mitochondrial inner membrane with its C terminus exposed to the intermembrane space. The tim18 null mutant is viable but displays cold-sensitive fermentative growth and slow respiratory growth, and in vitro import of mitochondrial inner membrane protein substrates of the TIM22 complex is delayed in extracts from the null mutant. The null mutant is also petite-negative, meaning that it cannot survive loss of the mitochondrial genome. In addition, the null mutant is resistant to some stresses that stimulate apoptosis, such as arsenic, hydrogen peroxide, and hyperosmolarity.