



Front cover image:  
The protein import machinery of the mitochondrial membranes. The greater part of all mitochondrial proteins is encoded by nuclear genes and are consequently synthesised as precursor proteins on cytosolic ribosomes. These undeveloped proteins must be targeted to and imported into mitochondria where they can acquire their functional and mature state. The translocate of the outer mitochondrial membrane (TOM complex) is the main entry gate into mitochondria and through a series of interactions with TOM complex receptors, precursors are guided to the "pore" of the complex in order to traverse the outer membrane. Upon outer membrane translocation different sorting pathways are initiated depending on the individual or multiple targeting elements contained within the precursor. Precursors possessing an N-terminal presequence are sorted to the presequence translocase of the inner membrane (TIM23 complex) in a membrane potential ( $\Delta\psi$ )-dependent manner. Complete translocation of precursors into the mitochondrial matrix is an ATP-driven process and requires the action of the presequence translocase-associated motor (PAM). Hydrophobic membrane proteins of the mitochondrial outer and inner membrane belonging to the  $\beta$ -barrel and carrier families, respectively, exploit the TIM chaperones of the intermembrane space for their passage through the aqueous environment. Following traffic through the intermembrane space,  $\beta$ -barrel precursors are directed to the sorting and assembly machinery (SAM complex) for outer membrane integration and carrier precursors are delivered to and inserted into the inner membrane by the  $\Delta\psi$ -driven carrier translocase (TIM22 complex).

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