Basic ways to interact with ribosomes

The biogenesis of proteins includes translation, folding, and transport to their functional location. The initial step in the biogenesis of many organellar and extracellular proteins of eukaryotic cells is their transport into the lumen of the endoplasmic reticulum (ER). Protein transport into the ER involves amino terminal signal peptides in the precursor proteins and a transport machinery. Ribosome-interacting proteins are involved in the decision whether a protein is synthesized in the cytosol or at the membrane of the ER. We characterized Mtj1p, a type I ER membrane protein, as a ribosome-interacting protein. Mtj1p contains a lumenal J-domain binding to the ER-lumenal Hsp70 chaperone BiP and a cytosolic domain, which is closely associated with translating ribosomes and has the ability to modulate translation. The interaction with ribosomes occurs near the exit site for the nascent polypeptide chain and involves a highly charged basic peptide within the cytosolic domain of Mtj1p. We propose that this interaction is a general mechanism for communication with ribosomes.