The Amazing Ribosome

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Ribosomes, the universal cellular machines, act as polymerases that translate the genetic code into proteins with high efficiency. They posses spectacular architecture accompanied by inherent mobility, which facilitate their smooth performance. The peptide bond formation site (PTC) is located within a universal internal symmetrical region connecting all of the remote ribosomal features involved in its functions. The elaborate architecture of this region is capable of positioning both the amino acylated and peptidyl tRNA substrates in stereochemistry required for peptide bond formation, for substrate-mediated catalysis, and for substrate translocation. Hence, enabling the repetition of peptide bond formation, namely amino acid polymerization. Adjacent to is an elongated tunnel along which nascent chains progress until they emerge out of the ribosome. This tunnel may be involved in gating and chaperoning function, provides the binding site of the first cellular chaperone that encounters the emerging nascent chain, and hosts a major family of antibiotics.