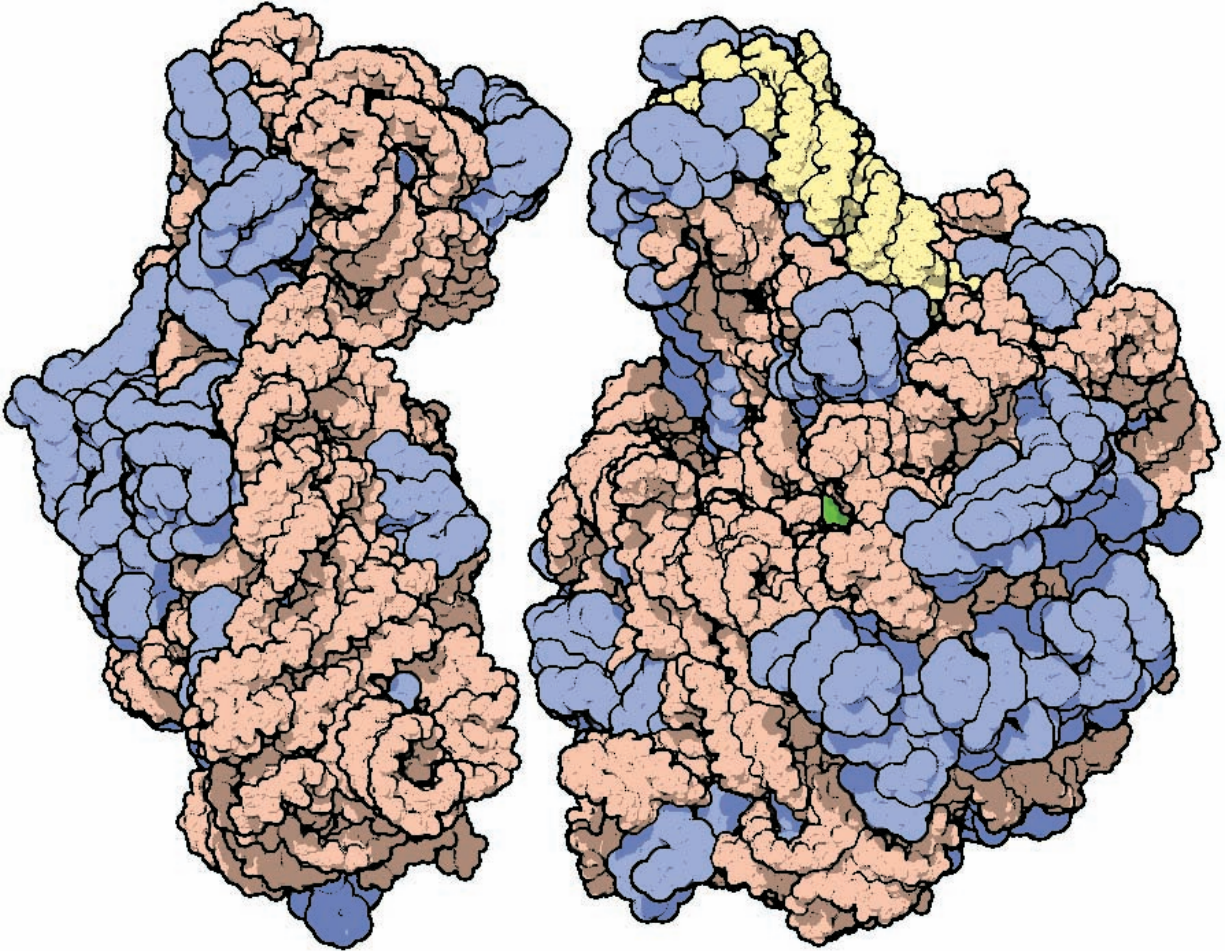


RIBOSOME

the factory of protein synthesis



Ribosomes are composed of two subunits: a large subunit (PDB ID **1ffk**), shown on the right, and a small subunit (PDB ID **1fka**), shown on the left. Of course, the term “small” is used in a relative sense here: both the large and the small subunits are huge compared to a typical protein. Both subunits are composed of long strands of RNA, shown here in orange and yellow, dotted with protein chains, shown in blue. When synthesizing a new protein, the two subunits lock together with a messenger RNA trapped in the space between. The ribosome then walks down the messenger RNA three nucleotides at a time, building a new protein piece-by-piece.

Image from the RCSB PDB's *Molecule of the Month* feature (www.pdb.org)

Three structural biologists have won the **2009 Nobel Prize in Chemistry** for studies of the structure and function of the ribosome—Venkatraman Ramakrishnan (MRC Laboratory of Molecular Biology), Thomas A. Steitz (Yale University), and Ada E. Yonath (Weizmann Institute of Science). The depositions of their first complete ribosome subunit structures (**1fjg**, **1ffk**, and **1fka**) almost a decade ago ushered structural biology into a new era. Since that time, more than 120 ribosome structures consisting of 50S, 30S subunits and complete 70S ribosomes have been contributed by these Nobel scientists. The structures, complexed with and without antibiotics, tRNAs, mRNAs, initiation factors, and release factors, provide a basis for understanding how the ribosome works and are useful tools for drug development.