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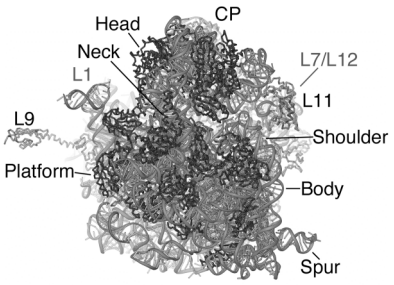
Structures of the Bacterial Ribosome at 3.5 Å Resolution: Apo-Ribosome and Complexes with Translocation Inhibitors. Maria A. Borovinskaya, Jamie H.D. Cate, Physical Biosciences Div., Lawrence Berkeley National Laboratory, Berkeley, CA 94720 USA.

Protein biosynthesis occurs on the ribosome in all forms of life. Ribosomes are large ribonucleoprotein complexes composed of a RNA functional core enhanced by ribosomal proteins. Ribosomes translate information encoded in mRNA into proteins in a sophisticated GTP-driven process involving tRNAs and various factors. The molecular mechanism of ribosomal action is not yet fully understood.

Here we describe two structures of the intact bacterial ribosome from *Escherichia coli* determined to a resolution of 3.5 Å by X-ray crystallography [BS Schuwirth et al, *Science* 310, 827 (2005)]. These structures provide a detailed view of the interface between small and large ribosomal subunits and the conformation of the peptidyl transferase center in the context of the intact ribosome. In these structures we observe swiveling of the head of the small subunit that, coupled to the ratchet-like motion observed previously, suggests a mechanism for translocation: the coordinated movement of mRNA and tRNAs on the ribosome following peptide bond formation.



Recently, we have determined structures of the *E.coli* ribosome in complexes with several antibiotics that inhibit translocation. These structures provide new insights into the mechanism of translocation.