


Structure of RNA polymerase bound to ribosomal 30S subunit.

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| Abstract | <p>In bacteria, mRNA transcription and translation are coupled to coordinate optimal gene expression and maintain genome stability. Coupling is thought to involve direct interactions between RNA polymerase (RNAP) and the translational machinery. We present cryo-EM structures of <i>E. coli</i> RNAP core bound to the small ribosomal 30S subunit. The complex is stable under cell-like ionic conditions, consistent with functional interaction between RNAP and the 30S subunit. The RNA exit tunnel of RNAP aligns with the Shine-Dalgarno-binding site of the 30S subunit. Ribosomal protein S1 forms a wall of the tunnel between RNAP and the 30S subunit, consistent with its role in directing mRNAs onto the ribosome. The nucleic-acid-binding cleft of RNAP samples distinct conformations, suggesting different functional states during transcription-translation coupling. The architecture of the 30S•RNAP complex provides a structural basis for co-localization of the transcriptional and translational machineries, and inform future mechanistic studies of coupled transcription and translation.</p> |
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