



REGIONAL CENTRE FOR BIOTECHNOLOGY
Journal Club

**“Protein-guided RNA dynamics during
early ribosome assembly”
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Abstract

The assembly of 30S ribosomes requires the precise addition of 20 proteins to the 16S ribosomal RNA. How early binding proteins change the ribosomal RNA structure so that later proteins may join the complex is poorly understood. Here we use single-molecule fluorescence resonance energy transfer (FRET) to observe real-time encounters between *Escherichia coli* ribosomal protein S4 and the 16S 5'domain RNA at an early stage of 30S assembly. Dynamic initial S4–RNA complexes pass through a stable non-native intermediate before converting to the native complex, showing that non-native structures can offer a low free-energy path to protein–RNA recognition. Three-colour FRET and molecular dynamics simulations reveal how S4 changes the frequency and direction of RNA helix motions, guiding a conformational switch that enforces the hierarchy of protein addition. These protein-guided dynamics offer an alternative explanation for induced fit in RNA– protein complexes.
