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Structural Studies of Prokaryotic Transcription. Seth A. Darst, The Rockefeller University, New York, NY 10021, USA.

The 3.3 Å-resolution X-ray crystal structure of *Thermus aquaticus* core RNA polymerase provides a basis for further structural and functional studies. The path of the transcript RNA and template DNA through the RNA polymerase structure was tracked using RNA-protein and DNA-protein crosslinks, resulting in a model of the ternary elongation complex. A co-crystal structure of core RNA polymerase complexed with rifampicin revealed the structural mechanism of the antibiotics' inhibition mechanism. Structures of RNA polymerase holoenzyme and a holoenzyme/promoter DNA complex provide insight into the process of promoter melting, abortive initiation, and the transition from initiation into elongation. The interactions of activators and transcription elongation factors with the RNA polymerase are being studied. Structures of sigma/anti-sigma complexes provide insight into the regulation of sigma factor function.

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