

P015 Conformational breathing of 40S-eIF1A probed via Maximum Likelihood refinement methods
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Translation is understood to consist of four stages: initiation, elongation, termination, and recycling. In eukaryotes, the small 40S ribosomal subunit is not capable of functional association with cellular mRNA alone. It needs to interact with a group of initiation factors (eIFs). The work described focuses on the initiation step and in particular involves investigating conformational changes in the eukaryotic 40S subunit during binding by eIF1A. This is being addressed using Maximum Likelihood (ML) analysis^[1], a Bayesian statistical approach implemented in the program Xmipp^[2]. In X-ray crystallography, ML approaches have resulted in significantly improved structure refinement procedures. In EM they allow for alignment, classification and reconstruction of cryo-EM images. This approach constitutes a robust tool for analysing complex, multiple-conformation systems, such as the eukaryotic ribosomal small subunit, and has yielded structures of the small subunit in novel conformations, remodelled by eIFs binding.

[1] Nat. Methods. 2007 Jan; 4(1) 27–9

[2] J. Struct. Biol. 2004 Nov; 148(2) 194–204