

P048 Single-molecule experiments investigating DEAD-box helicases and their role in cellular disease

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eIF4A is the prototypical member of the DEAD-box helicase family, displaying both RNA dependent ATPase activity and ATP dependent RNA helicase activity. In addition to its role in translation initiation where it is thought to facilitate ribosomal scanning by unwinding RNA secondary structure, eIF4A has been implicated in a variety of cellular functions, including cell cycle control in *Arabidopsis* and decapentaplegic signalling in *Drosophila*. Its overexpression in melanoma and precursor T-cell lymphoblastic leukaemia, in combination with its inhibition by tumour suppressor gene, programmed cell death (Pcd)4, mean that further investigation into eIF4As mechanism of action may validate it as a potential drug target candidate.

Single molecule experiments provide a powerful tool for exploring molecular motors, allowing detailed analysis of their kinetics and thermodynamics to afford a greater and more accurate insight into their step by step motion. We will present methods of RNA hairpin construct assembly and single molecule manipulation using both atomic force microscopy and laser optical tweezers in order to investigate human eIF4A and its interacting factors eIF4B and eIF4H.