

ISMB Retreat June 2007 – Poster Abstract

Kinesins in Malaria

Kinesins form a large super family of motor proteins ubiquitous across a number of eukaryotic species including mammals and yeast. They utilise energy derived from ATP hydrolysis and interact with microtubules to fulfill their function. Defined by their motor domain, which contains the microtubule binding site, and ATP binding site, a number of kinesins have been identified, and found to perform different roles within the cell. This includes kinesin 5, which is vital for chromosome separation during mitosis and kinesin 13, which depolymerises microtubules. In comparison, very little is known about kinesins in the most virulent of malarial parasites *Plasmodium falciparum*.

The goal of this research project is to try and characterize a number of kinesins from *Plasmodium falciparum* in the hope that this will reveal novel behaviours, and unique structures that are parasite specific, thereby allowing it to be an interesting new drug target. Sequence alignments already show that there are significant differences between malarial and other eukaryotic kinesins, one key difference being that the malarial proteins appear to have large asparagine rich amino acid inserts, whose function is yet to be elucidated.

Initial attempts have been made to express and purify recombinant protein of the kinesin-5 and kinesin-13 motor domains from *Plasmodium falciparum*, and the asparagine rich insert from the kinesin-5 motor domain. Once an expression and purification protocol has been established for the production of these kinesins, biochemical characterization can take place using a variety of standard *in vitro* assays and techniques. Cryo-electron microscopy will also be performed to try and determine a high resolution structure of kinesins bound to tubulin, enabling the visualisation of the interaction between the kinesins and microtubules directly.