**Nanofilament assembly from the perspective of Intermediate filaments**

Roy A. Quinlan, Ming Der Perng and Andrew Landsbury

Biophysical Sciences Institute, The University of Durham, South Road, Durham DH1 3LE, UK

Intermediate filaments are 10nm in diameter and are assembled from protein subunits rich in a-helix. The subunit assembly pathway starts with a parallel, in register coiled coil which is ~45nm long. This dimerises to form an antiparallel 4 chain unit. Lateral association of these units leads to the formation of a 65-70nm long unit length filament that is 16nm in diameter. These then elongate by end to end fusion and the final step in the assembly process is the compaction of the assembled filament to produce the 10nm filament. This deceptively simple process produces filaments of infinite length, but uniform in width and this is something that is proving difficult to mimic using polypeptides. We have started to dissect the role of the C-terminal non-a-helical domain in this assembly process using recombinantly expressedproteins and using evolution biology to expose its role. Our analysis of disease causing mutations in GFAP and of BFSP2 orthologs reveal that the C-terminus is involved in both width control and the elongation stages in intermediate filament assembly.