Determining the Antagonistic Relationship between the Enabled and Capping Proteins in the Central Nervous System

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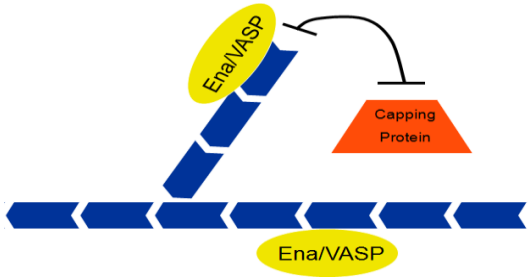
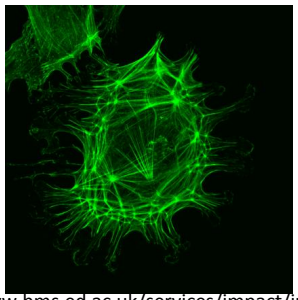
Project Background and Goals

- The Actin cytoskeleton and its regulation are crucial in development. A key actin regulator is Capping Protein (CP), which prevents actin monomers from attaching to the filament. The opposite effect is produced by the protein Enabled (Ena)/VASP family of proteins. Ena allows addition of monomers to the barbed end, promoting elongation. Therefore, Ena's function is also antagonistic to that of capping protein (Gates et al, 2007).



- Goal1: begin to explore the antagonistic relationship between Ena and CP. By generating a reliable protocol to test for the presence of both mutations on the same chromosome; eventually generate ena^{46} and ena^{23} recombinant flies
- Goal 2: determining the role of Ena in CNS development. It is already clear that Ena is important for CNS development, as a previously characterized mutant of Ena, ena^{23}, results in defects. I started to characterize another allele of Ena, ena^{46} in this context.



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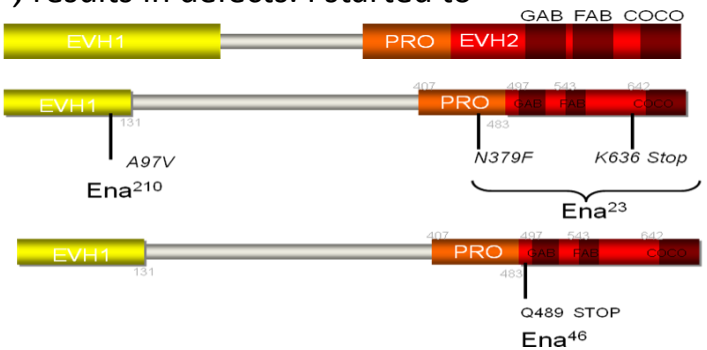
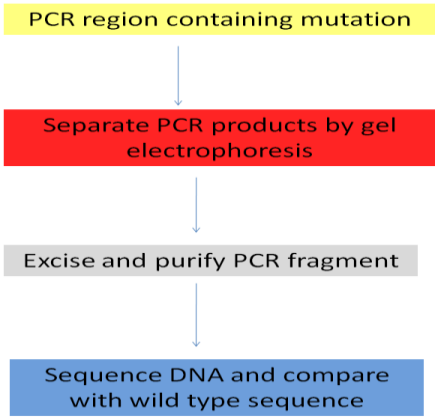
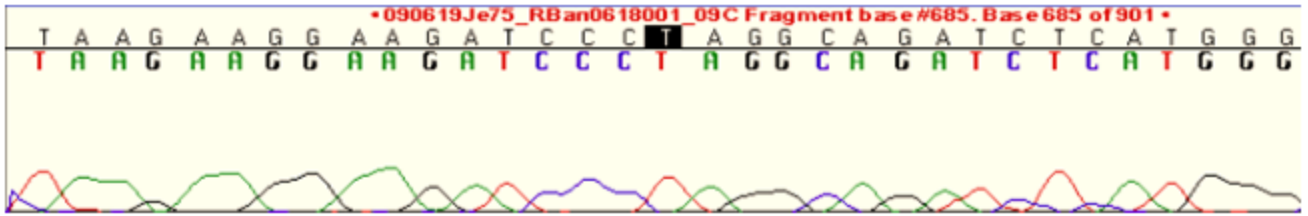


Results

Goal 1

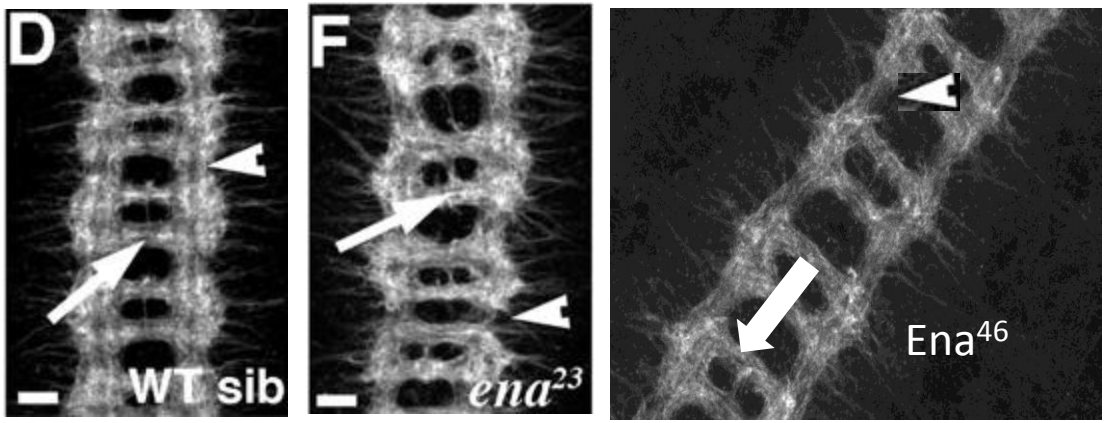




I performed this protocol separately for the cpb^{f44} and ena^{46} mutations, with promising results; I was able to detect the mutation in the final DNA sequence in both the cpb^{f44} and ena^{46} experiments. Currently, I am working on using this protocol to identify both mutations on the same chromosome, after which I will be able to examine its effects on development.

Goal 2

CNS defects associated with ena46 appear to be no more severe than those associated with ena23. However, this experiment must be repeated, and the number of embryos examined must be increased. Direct comparison of ena^{23} and ena^{46} is complicated as–recent findings have shown that ena^{46} is expressed at drastically lower levels in flies than ena^{23}. This difference in degree of expression complicates analysis.



CNS images from Wild Type, ena23, and ena46 flies. Arrow heads show longitudinal axons, arrows show commissural axons.