



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Danielle B. Andrews	Project Number S0401
Project Title The Involvement of Small G-protein ARL-6 in the Formation of Sensory Cilia	
Abstract Objectives/Goals Compartmentalized cilia play an essential role in mechanosensory transduction and perception of the environment. The aim is to identify and verify highly-conserved proteins required for formation of sensory cilia. Methods/Materials A bioinformatic approach was utilized to identify homologous small G-protein genome sequences relatively conserved among evolutionarily divergent eukaryotes with compartmentalized cilia. An identified candidate gene was characterized genetically using deletion and point mutant stocks of <i>D. melanogaster</i> . Results Two candidate small G-proteins (Arl3 and 6) were identified by comparative genomics within 37 genes tested among the four eukaryotes with compartmentalized cilia. A <i>Drosophila</i> deletion stock mapped to a region around Arl6 crossed to two "potential mechanosensory point mutants" on chromosome 2 yielded uncoordinated flies unable to fly or walk. This phenotype is characteristic of flies with defects in compartmentalized ciliogenesis. Conclusions/Discussion Arl 6 is one of two genes identified by comparative genomics to be a protein conserved among organisms with compartmentalized cilia. An uncoordinated phenotype was demonstrated in <i>Drosophila</i> potentially defective in Arl6, validating the bioinformatic approach used to find key genes in perception/mechanosensory transduction. Further research should be done to determine whether Arl 6 transgene insertion can rescue the phenotype. The specific role of Arl 6 in ciliogenesis warrants further study.	
Summary Statement Small G-protein Arl6 appears involved in the formation of a specific type of cilia required for mechanical sensing of the environment.	
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