

Faculty Supervisor: Joe Gindhart, Biology Department

Project Title: Catching kinesin by the tail: investigation of kinesin-binding proteins in *Drosophila*

Project Description: My lab is interested in understanding how the microtubule motor protein kinesin-1 transports its cargos in the cell. Organelles such as nuclei, mitochondria, and vesicles are too large to diffuse rapidly within a cell; to them, the cytoplasm is like swimming in a pool of jello. Therefore, eukaryotic cells have evolved a mechanism for directed organelle transport using motor proteins and the cytoskeleton. Motor proteins such as kinesin and myosin use the chemical energy within ATP to walk along the cytoskeleton. Cargos that attach specifically to motor proteins can be pulled along the cytoskeleton from one part of the cell to another; this process is important for well-known phenomena such as mitosis and muscle contraction, as well as other cell processes such as secretion and cell signaling. We use the fruit fly *Drosophila melanogaster* as a model system for studying how the kinesin-1 motor works in the cell. Kinesin-1 is conserved evolutionarily, so better understanding how kinesin-1 works in fruit flies can help us learn how kinesin-1 works in higher organisms. Projects are available for students interested in using genetics, biochemistry, molecular biology, and microscopy to study these interesting phenomena.

Prerequisites: Enrollment in Genetics or Introductory Chemistry, interest in scientific research.

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