INSTITUTE FOR CELLULAR ENGINEERING

Chase of the Walking Proteins

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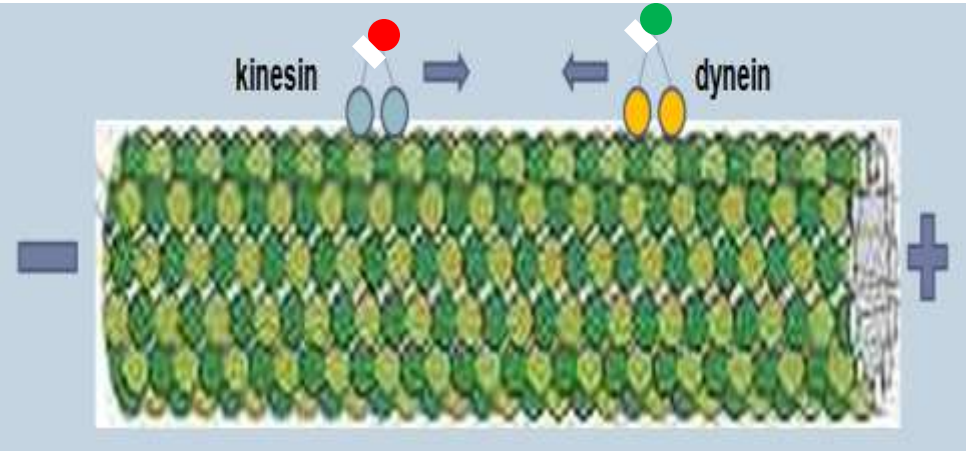
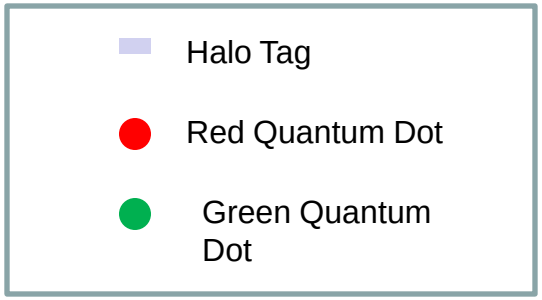


Figure 1. Model of Labeled Kinesin and Dynein on Microtubule Track



Conway, L. 2009

• Motor proteins are responsible for transporting cellular materials vital for cell function along microtubule tracks. Cargo depend on these proteins to travel from one place to another in a timely manner, as it is faster than diffusion. Our research hopes to gain insight into how motor molecules, specifically kinesin and dynein, behave when encountering an obstacle along a microtubule lattice . Such obstacles may include non-motile kinesin or kinesin vs. dynein (because they walk in opposite directions as shown in Figure 1). A thorough understanding of their biophysical properties will shed light on how to cure diseases caused by deficient cargo transport, as in Alzheimer's disease.

•Kinesin and dynein constructs will be made with a Halo Tag. The Halo Tag will allow a streptavidin-conjugated quantum dots to be added to the proteins via a biotin ligand that binds to the Halo Tag. The quantum dot will act as a fluorescent probe. By using different color quantum dots, different proteins can be easily differentiated when analyzed under the total internal reflection fluorescence (TIRF) microscope in single molecule assays.

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