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Interplay between group function of kinesin based transport and lipid bilayer mobility. JOSEPH LOPES, LINDA HIRST, JING XU, University of California, Merced — Motor proteins, discovered in recent decades, are important building blocks to life. These molecular machines transport cargo and although indispensable to cell function, are not well understood at present. Single kinesin transport properties have been documented, but their group function remains unknown. In this project, the properties of kinesin-based transport by multiple motors are investigated in-vitro to establish a link between travel distance and lipid diffusion in the vesicle membrane. In the experiments, silica beads coated in a supported lipid membrane and giant lipid vesicles are transported along a microtubule by embedded kinesin motors. In an alternate geometry, this system can be inverted, whereby motors are bound to a surface of a lipid bilayer and microtubules are deposited. We have characterized motor function with respect to the fluidity of the membrane. To measure the diffusion properties of different membranes, planar lipid bilayers are prepared on silica slides and supported by bovine serum albumin protein. To establish a diffusion constant at room temperature for the lipid membrane we use the FRAP technique (fluorescence recovery after photobleaching). Using this method we can investigate if there is any interplay between group travel function and membrane fluidity.

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