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Nanotransport Using The Kinesin Motor Protein A. SIKORA, J. RAMON-AZCON, D. OLIVEIRA, K. KIM, WPI-AIMR, Tohoku University, Japan, A.L. LIAO, WPI-AIMR, Tohoku University, Japan and Materials Science and Engineering, Texas A&M University, M. UMESTU, T. ADSCHIRI, WPI-AIMR, Tohoku University, Japan, I. KUMAGAI, Department of Biomolecular Engineering, Tohoku University, Japan, W. HWANG, Materials Science and Engineering; Department of Biomedical Engineering, Texas A&M University, W. TEIZER, WPI-AIMR, Tohoku University, Japan; Materials Science and Engineering and Department of Physics and Astronomy, Texas A&M University — The kinesin motor protein is one of the major contributors in cell division and intracellular transportation of cargo. Kinesin converts chemical energy into mechanical work with a yield greater than 50% and it can transport large size cargo along several micrometers, moving on a biopolymer track called microtubule. The kinesin-microtubule system has been studied *in vitro*. Two main configurations exist. In the first one, the gliding mode, microtubules are propelled by kinesin proteins bound to a substrate. In the second one, the kinesin molecules "walk" on the microtubule. Kinesin can be engineered in order to allow binding of specific cargo. In this study, we are using biotinated kinesin which allows strong non-covalent binding with streptavidin, which can cover any nano object. Using fluorescence microscopy, transport of quantum dots has been studied. Velocities have been analyzed and the results are in good agreement with data from the literature. New approaches using multiwall carbon nanotube tracks, aligned by dielectrophoresis, have also been investigated.

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