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Glass micro-wire tracks for guiding kinesin-powered gliding motion of microtubules K. KIM, WPI-AIMR, Tohoku Univ, A. L. LIAO, WPI-AIMR, Tohoku Univ; Materials Science and Engineering, Texas A&M Univ, A. SIKORA, D. OLIVEIRA, WPI-AIMR, Tohoku Univ, M. UMETSU, WPI-AIMR, Tohoku Univ; Dept of Biomolecular Engineering, Tohoku Univ, I. KUMAGAI, Dept of Biomolecular Engineering, Tohoku Univ, T. ADSCHIRI, WPI-AIMR, Tohoku Univ, W. HWANG, Materials Science and Engineering and Dept of Biomedical Engineering, Texas A&M Univ, W. TEIZER, WPI-AIMR, Tohoku Univ; Materials Science and Engineering and Dept of Physics and Astronomy, Texas A&M Univ
— Kinesin, an enzyme molecule found in eukaryotic cells, walks on specific paths, namely microtubules. These microtubules, self-assembled *in-vitro*, cooperate with kinesin molecules by playing the role of either a track for the molecular motors or a lengthy cargo lorry driven by the motor molecules. One of major challenges in utilization of the latter case, which is particularly advantageous for practical applications because of the longer cruising range and the higher carrying capacity of the bio-transporter, is herding the gliding microtubules. A general approach to achieve this goal is aligning motor molecules along a track. In previous attempts such tracks were physically and/or chemically patterned on a glass surface. We use a kinesin-coated glass wire to demonstrate kinesin-powered gliding movement of microtubules confined by the wire-like structure. This new approach distinguishes itself in that the glass wire track is an independent entity, being separable from a two-dimensional surface in principle. We will also discuss quantitative analysis of the guided motility and potential applications.

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