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Microtubule-Based Transport by Multiple Identical Molecular Motors.

A system of stochastic differential equations (SDEs) is used to model the interaction between processive molecular motors, such as kinesin and dynein, and the biomolecular cargo they tow as part of microtubule-based intracellular transport. Moreover, the classical experimental fluid environment fits within a parameter regime which is qualitatively distinct from conditions one expects to find in living cells. Through an asymptotic analysis of our system of SDEs, a means for applying *in vitro* observations of the nonlinear response by motors to forces induced on the attached cargo is developed to make analytical predictions for two parameter regimes that have thus far eluded direct experimental observation: 1) highly viscous *in vivo* transport and 2) dynamics when multiple identical motors are attached to the cargo and microtubule. Time permitting, the connections between the model described and models at the single motor level will be discussed.