1056-92-58 **Filippo Posta*** (fposta@ucla.edu), UCLA Medical Center, Dept. Biomathematics, Box 951766, Los Angeles, CA 90095, and **Maria R. D'Orsogna** and **Tom Chou**. *Enhancement of cargo processivity by cooperating molecular motors.*

Cellular cargo can be bound to cytoskeletal filaments by multiple molecular motors. Recent experiments have shown that the presence of auxiliary, nondriving motors, results in an enhanced processivity of the cargo, compared to the case of a single active motor alone. We model the observed cooperative transport process by a stochastic model that describes the dynamics of two molecular motors, an active one that moves cargo unidirectionally along a filament track and a passive one that acts as a tether. Analytical expressions obtained from our analysis are fit to experimental data to estimate the kinetic parameters of our model. Our analysis reveals two qualitatively distinct processivity-enhancing mechanisms: the passive tether can decrease the typical detachment rate of the active motor from the filament track or it can increase the corresponding reattachment rate. Our estimates show that in case of microtubular transport, a higher average run length arises from the ability of the passive motor to keep the cargo close to the filament, enhancing the reattachment rate of an active kinesin motor that has recently detached. For myosin-driven transport along actin, the passive motor tightly tethers the cargo to the filament, suppressing the detachment rate of the active myosin. (Received July 20, 2009)