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Interplay between Velocity and Travel Distance of Kinesin-based Transport in the Presence of Tau[1] JING XU, University of California, Merced, STEPHEN KING, University of Central Florida, MARYSE LAPIERRE-LANDRY, BRIAN NEMEC, University of California, Merced — Although the disease-relevant microtubule-associated protein tau is known to severely inhibit kinesin-based transport in vitro, potential mechanisms for reversing this detrimental effect to maintain healthy transport in cells remain unknown. Here we report the unambiguous up-regulation of multiple-kinesin travel distance despite the presence of tau, via decreased single-kinesin velocity. Intriguingly, the presence of tau also modestly reduced velocity in multiple-kinesin transport. Our stochastic simulations indicate that the tau-mediated reduction in single-kinesin travel is sufficient for the observed reduction in multiple-kinesin velocity. Taken together, our observations suggest that single-kinesin velocity is a promising experimental handle for tuning the effect of tau on multiple-kinesin travel distance, and uncover a previously unexplored role of tau for inhibiting multiple-kinesin velocity via reducing single-kinesin travel distance.

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