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*Impact of noise on the regulation of intracellular transport of intermediate filaments*

Noise affects all biological processes from molecules to cells, organisms and populations. Although the effect of noise on these processes is highly variable, evidence is accumulating which shows natural stochastic fluctuations (noise) can facilitate biological functions. Herein, we investigate the effect of noise on the transport of intermediate filaments in cells by comparing the stochastic and deterministic formalizations of the bidirectional transport of intermediate filaments, long elastic polymers transported along microtubules by antagonistic motor proteins. By numerically exploring discrepancies in timescales and attractors between both formalizations, we characterize the impact of stochastic fluctuations on the individual and ensemble transport. We find that noise promotes the collective movement of intermediate filaments by reducing the impact of initial distributions of motor proteins in cells and increases the efficiency of the transport regulation by the biochemical properties of motor-cargo interactions.