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Myosins V and VI increase actin filament flexural rigidity through a weak to strong binding transition BRANNON MCCULLOUGH, WENXIANG CAO, ENRIQUE DE LA CRUZ, Yale University — Myosins are ATPase molecular motors that couple ATP hydrolysis with force generation along actin filaments. Myosin alters the torsional dynamics of actin filaments, which may contribute to aspects of force generation and nucleotide-dependent stability of the actin-myosin complex. We measured how biochemical ATPase-cycle intermediate states of high-duty myosins V and VI affect the flexural rigidity of actin filaments by analyzing the angular correlation of thermally driven shape fluctuations. Both myosins increase the flexural rigidity of actin filaments in a manner that depends on the chemical state of bound adenine nucleotide. High binding affinity states increase the flexural rigidity of actin filaments more than weak binding states. These results indicate that actin filaments may flex during myosin cycling to allow bound motors to coordinate stepping.

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