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Biological motors: Conventional and Unconventional Myosins¹

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Molecular motors are smart, soft machines that regulate their dynamics and energy consumption for efficient tuning to their cell-biological role and mechanics of their cargo. The efficiency is derived partly from harnessing the chaotic thermal fluctuations nano-scale machines experience, rather than struggle against them. Reciprocal coupling between the enzymatic chemistry, structural changes, and mechanical steps is expected from the thermodynamics of an energy-transducing nano-machine. Strong evidence for this bidirectional coupling exists for muscle (conventional) myosin and unconventional myosins. The structural dynamics of myosin leading to translocation along actin are detectable by Optical Trap Mechanical Nanometry (OTNM), Single-Molecule Fluorescence Polarization Microscopy (SMFPM), Fluorescence Imaging at One Nanometer Accuracy (FIONA) and various combinations of these methods. We are in an Acronym Rich Environment (ARE). Progress and puzzles make this a lively research area.

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