

## A General Random Walk Model of Molecular Motor

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Abstract: A general random walk model framework is presented which can be used to statistically describe the internal dynamics and external mechanical movement of molecular motors along filament track. The motion of molecular motor in a periodic potential and a constant force is considered. We show that the molecular motor's movement becomes slower with the potential barrier increasing, but if the force is increased, the molecular motor's movement becomes faster. The relation between the effective rate constant and the potential barrier's height, and that between the effective rate constant and the value of the force are discussed. Our results are consistent with the experiments and relevant theoretical consideration, and can be used to explain some physiological phenomena.

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Key words: random walk, effective rate constant, potential barrier

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