



FRONTIERS IN MICRORHEOLOGY



Dynamics of inchworm models for helicase unwinding

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Abstract: We consider the unwinding of DNA or RNA by helicases as a one-dimensional hopping system where a motor protein consisting of two domains hopping with different step sizes. By solving the master equations exactly, we obtain the average velocity and the dispersion in terms of the forward and backward transitions rates.

We find that the velocity as a function of the ATP concentration is well described by the Michaelis–Menten law. We relate our results to a recent experimental result on the inchworm-like motions of an RNA helicase moving with different step sizes.

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