

Molecular Motors: Averaging a Stochastic Process

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Abstract

While small molecules like glucose can rely on the process of diffusion to get where they need to go, larger cargo like vesicles and organelles need extra help to navigate the cytoplasm of cells. Molecular motor proteins fill this role. These directional motors bind to cargo and move in a hand-over-hand manner along microtubules. In this talk, we consider the binding rate of a diffusing motor/cargo complex to a microtubule as a function of distance. We view diffusion as a fast process and binding as a slow process. As the survival function is deterministic, we need to 'average' the stochastic effects of diffusion out. We provide an analytic proof of the principle of averaging and an application to molecular motors.