生物物理学报(2005) 21(6), 431-435

PDF文档

Myosin V随机步长分布的动力学分析

高秀军、展永、赵同军、韩英荣
河北工业大学

摘要：myosin V利用ATP水解释放的自由能，朝肌动蛋白微丝正端作定向运动，平均步长约为36nm. 最近几年的诸多实验数据表明，myosin V步长和出现概率的柱状图符合高斯分布，马达步长并非固定的36nm；且在负载力大于2pN的情况下会出现 “中间步长”和后退步子的现象. 可以根据已有的实验数据，同时考虑溶液摩擦力、常负载力和高斯随机力对马达位置的影响，提出一种马达的跃迁模型，并以此为基础对上述现象进行理论解释.

Kinetic study of stochastic distribution of myosin V’s step size

Abstract: Myosin V moves along actin filament toward barbed end processively by hydrolyzing ATP. Presently, “Hand-over-Hand” model of myosin V has been strongly supported by many experimental results, the average step size is about 36nm. Further more, when the motor is at low load (under 1.5pN), its step size histograms are well fit for a Gaussian distribution, the equalizing value is about 36nm——the same as the average step size. when the load is high (above 2pN), besides the broader Gaussian distribution of step sizes, “steps of intermediate” and backward steps can be observed much more frequent than at low load. Theoretical explanation to the phenomena with Langevin equation may be help to know more about the mechanism of the motor.

关键词

Myosin V; 朗之万方程(Langevin equation); 高斯随机力(Gaussian stochastic force)