Fluctuation of actin sliding over myosin thick filaments in vitro

http://www.firstlight.cn 2005-06-16

It is customarily thought that myosin motors act as independent force-generators in both isotonic unloaded shortening as well as isometric contraction of muscle. We tested this assumption regarding unloaded shortening, by analyzing the fluctuation of the actin sliding movement over long native thick filaments from molluscan smooth muscle in vitro. This analysis is based on the prediction that the effective diffusion coefficient of actin, a measure of the fluctuation, is proportional to the inverse of the number of myosin motors generating the sliding movement of an actin filament, hence proportional to the inverse of the actin length, when the actions of the motors are stochastic and statistically independent. Contrary to this prediction, we found the effective diffusion coefficient to be virtually independent of, and thus not proportional to, the inverse of the actin length. This result shows that the myosin motors are not independent force-generators when generating the continuous sliding movement of actin in vitro and that the sliding motion is a macroscopic manifestation of the cooperative actions of the microscopic ensemble motors.

存档文本

北京雷速科技有限公司 版权所有 2003-2008 Email: leisun@firstlight.cn