肌肉收缩及自发振动的动力学理论

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改变实验条件，肌纤维可发生从收缩到自发振动的相变。为了研究这一现象，引进了描述肌纤维内部弹性成分拉伸长度与张力关系的表达式，利用肌肉态方程并考虑肌纤维的特殊结构，给出了描述肌纤维收缩及自发振动的统一动力学方程。从动力学方程出发，肌纤维自发振动的发生条件得到了自然解释，所给出的振动周期和振动曲线同实验结果相符，并给出了一些新的理论结果。这一工作的意义在于，完成了从肌球蛋白单分子性质、肌纤维组织结构到肌纤维功能的信息整合。

A dynamic theory on muscle contraction and spontaneous oscillation

Changing experimental conditions, the phase change of muscular fibre contraction to muscular fibre spontaneous oscillation can take place. In order to study this phenomenon, a formula describing the force versus extension characteristic of elastic elements in muscular fibre is introduced, utilizing the muscle state equation and taking the special structure of muscular fibre into account, the kinetic equation which can lead to both contraction and oscillation of the muscular fibre is presented. Proceeding from the kinetic equation, the occurrence of muscular fibre spontaneous oscillation is explained in a natural way, the period of isotonic spontaneous oscillation and the oscillation curves are consistent with experimental data, and some new theoretical results are presented. The significance of this work is that the information from the properties of myosin and the structure of muscular fibre to the functions of muscular fibre has been conformitied.

关键词

信息整合(Information conformity)；肌纤维(Muscular fibre)；相变(Phase change)；动力学方程(The kinetic equation)；弹性成分张力(The force of the elastic element)