

# 峰峰间期逐渐增大的动力学机制

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在3或4个轻度结扎受损的大鼠坐骨神经上加入5 mmol/L EGTA的无钙灌流液的神经生理实验中,可以观察到一种在活动相峰峰间期逐渐增大的周期阵发放电现象。从非线性动力学角度分析该现象产生的动力学机制对于理解神经元复杂的放电行为具有重要意义。通过Hindmarsh-Rose 神经元模型的分析,对该现象产生的一种可能的机制进行了揭示,即鞍结分岔和鞍点同宿分岔支配着这种阵发放电形式,而且后者对峰峰间期逐渐的增大起着更重要的作用。

## THE INTERSPIKE INTERVAL INCREASES GRADUALLY: WHY?

A phenomenon that the interspike interval increases gradually in a burst has been observed in the rat injured sciatic nerve with 3 or 4 loose ligatures after the addition of 5 mmol/L ethylene glycol tetraacetic acid(EGTA). It is significant to make clear dynamical mechanism for the emergence of such a phenomenon for understanding neuronal complex discharge behavior. By the use of Hindmarsh-Rose neuron model, one possible mechanism is revealed from the perspective of nonlinear dynamics. Namely, it is saddle-node bifurcation and saddle-homoclinic orbit bifurcation that dominate this type of bursting, and the latter plays a more important role in leading to the gradual increase of the interspike interval.

### 关键词

峰峰间期(Interspike interval); 鞍结分岔(Saddle-node bifurcation); 鞍点同宿分岔(Saddle-homoclinic bifurcation); 方波阵发放电(Square-wave bursting)