龙虾胃肠神经系统的数值分析

刘深泉[*1]、L. Song[2]
1　华南理工大学应用数学系
2　School of Information Technology, The University of Sydney, Australia

　　利用抑制神经系统的WinnerLess Competition（WLC）模型，通过数值方法分析Mulloney 型龙虾胃肠神经系统神经元的电位发放，得到胃研磨囊和幽门神经系统中各个神经元的电位发放和系统的节律变化。结果表明，胃研磨系统内神经元的发放规律显示两侧牙齿和中间牙齿出现切断、挤压和研磨食物等状态，幽门系统内神经元的发放规律显示幽门节律出现依次发放的三个部分。两个神经系统的数值结果，不仅解释了龙虾胃肠神经系统中神经元电位发放与肌肉运动的关系，而且理论再现了龙虾胃肠神经系统的节律变化和实验结果。

THE NUMERICAL ANALYSIS OF LOBSTER STOMATOGASTRIC NERVOUS SYSTEM

　　With help of WLC model of inhibition nervous system and lobster neural structure of Mulloney's, neuron electric spike of lobster stomatogastric neural system was numerically analyzed and the changing activity of gastric network and pyloric network were obtained. The simulation results showed that the electric spikes of gastric neurons revealed the lateral teeth and the medial tooth of gastric network have the function of cutting, squeezing and grinding. The electric spike of pyloric neuron revealed the rhythm of pyloric network and it appeared three main phases in order, which correspond different neurons electric spikes. The numerical results of these two neural systems not only explained the relation between electric spike and movement of muscle but also revealed rhythm activity and experiment phenomena of lobster stomatogastric neural system in theoretical model.

关键词