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PDF文档

鲫鱼外层视网膜突触强度可塑性及模型分析

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押视网膜亮度型水平细胞的光谱敏感性随刺激模式而变。建立一数学模型以对这种现象的生理机制进行探讨。模型包括两个并行的信号通道,即红敏视锥和绿敏视锥信号通道,神经元之间的突触连接强度在模型中表示为相应通道的放大系数;系统输出,即水平细胞对光反应幅度,为由两个通道输出之线性和。模型假设各个通道的状态是可调的,其各个时刻的放大系数与其自身状态呈正相关,而与系统输出呈负相关。模型输出能对实验数据做出较好的描述。

SYNAPTIC PLASTICITY IN THE OUTER PLEXIFORM LAYER OF CARP RETINA AND MODEL ANALYSIS

The spectral sensitivity of luminosity type retinal horizontal cell (LHC) is stimulus pattern dependent. A mathematical model is developed in this study to investigate the possible physiological mechanism underlying such phenomenon. The model consists of two parallel signal pathways, which are the red- and green-cone signal pathways respectively. The strength of synapses between the relevant neurons of each signal pathway is represented by its gain term; a linear summation of the output of each pathway forms the system output, which represents the LHC's light response. With the assumption that the status of each pathway is modifiable, i.e., the gain of each pathway is positively related to its current status and negatively related to the system output, the model prediction describes the experimental observations reasonably well.

关键词

视网膜水平细胞(Retinal horizontal cell); 光谱敏感性(Spectral sensitivity); 对光反应(Light response); 模型分析(Model analysis)