

刺激大鼠杏仁外侧核对皮层A I 区ON-OFF神经元反应及调谐曲线的影响

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在30只氨基甲酸乙酯麻醉的SD大鼠上记录神经元单位放电, 观察短纯音诱发的皮层A I 区神经元ON-OFF反应的特性及电刺激杏仁外侧核(lateral amygdaloid nucleus, LA)对ON-OFF反应以及调谐曲线的影响。实验证实, A I 区神经元ON-OFF反应的模式与纯音刺激的强度、频率及作用时程有关; 刺激LA可以抑制ON-OFF反应的放电频数, 使反应的阈值升高, 或使反应放电构型发生变化; 此外, 刺激LA能使ON-OFF神经元的调谐曲线变窄, Q10数值增大。研究结果不仅表明ON-OFF神经元能对纯音刺激的时程、强度和频率等多种信息进行编码, 而且还证明杏仁外侧核可以在皮层水平参与听觉信息的调制, 削弱或衰减某些听觉信息, 导致整个调谐曲线上移变窄, 从而提高A I 区ON-OFF神经元的频率选择性能, 有利于检测外界嘈杂环境中特定的听觉信息。

INFLUENCE OF STIMULATING LATERAL AMYGDALOID NUCLEUS ON THE ACTIVITY AND TUNING CURVE OF ON-OFF RESPONSE NEURON IN THE A I AREA OF THE RAT'S CORTEX

Experiments were performed on 30 SD rats anaesthetized with urethane. The unit discharge of auditory neuron in the cortical A I area was recorded with the extracellularly recording method. The character of ON-OFF responses induced by short pure tone and the influence of stimulating lateral amygdaloid nucleus (LA) on these responses and the tuning curves of the recorded neurons were examined. The experimental results approved that the pattern of the ON-OFF response was related to the intensity, frequency and duration of the pure tone and the LA stimulation could decrease the discharge of ON-OFF neurons in A I area, enhance the threshold of the ON-OFF response or change the modality of the response of these neurons. Furthermore LA stimulation could narrow the turning curve of the ON-OFF neurons and increase its Q10 values. All these indicate that the A I ON-OFF neuron encodes multiple information of the sounds, and the LA can modulate auditory information at the cortex level, thus improve the ability of filtrating frequency information of ON-OFF neurons in A I area and detecting particular auditory information from the surrounding noisy environment.

关键词

杏仁外侧核(Lateral amygdaloid nucleus); 皮层A I 区(Cortical area A I); ON-OFF反应(ON-OFF response); 调谐曲线(Tuning curve)