

# GABA能抑制调制大棕蝠下丘听神经元时间编码模式

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大棕蝠(*Eptesicus fuscus*)下丘神经元对重复率为10 pps(pulse per second)、30 pps的串声刺激均产生跟随反应,但对90 pps串声刺激的跟随反应则不尽相同。微电泳bicuculline阻断GABA能抑制作用后,所记录的58个神经元中,有13个(22%)放电率及串声刺激反应模式无变化;45个(78%)神经元放电率有不同程度的增加,对10 pps、30 pps串声刺激仍能产生跟随反应,但对90 pps串声刺激的跟随反应模式有多种变化。其中:17个(29%)神经元为放电率增加的跟随反应;9个(15%)神经元放电率增加,对前100 ms的串刺激产生反应且放电密集,而对随后200 ms的串刺激只产生少量的放电;15个(26%)神经元放电率增加,在前几十毫秒范围内有较多的放电反应,后续的反应很弱;4个(7%)神经元只对第一个声刺激产生反应,且放电率增加,随后放电急剧减少。结果提示中脑下丘神经元对听觉信息的时间编码可能具有更复杂的机理。

## THE EFFECTS OF GABA ON TEMPORAL DISCHARGE PATTERNS OF IC NEURONS TO ACOUSTIC PULSER TRAIN IN THE BIG BROWN BAT, *Eptesicus fuscus*

In the big brown bat, *Eptesicus fuscus*, which can use echolocation for hunting and navigation, the inferior collicular (IC) neurons responded to every pulse of pulsatile amplitude-modulated (PAM) sound signal train in 10 pps (pulse per second) and 30 pps. But the temporal discharge patterns of IC neurons vary in response to the pulses of 90 pps sound train. The responses of 45(78%) IC neurons tested were changed during the application of bicuculline, a competitive antagonist for  $\gamma$ -aminobutyric acid-A ( $GABA_A$ ) receptors. These neurons responded to every pulse of 10 pps and 30 pps sound train before and during bicuculline application. But when the pulse repetition rate of sound train was 90 pps, the responses of the neurons changed a lot. During bicuculline application, the discharges increased and the neurons still responded to every pulse of 90 pps sound train in 17(29%) IC neurons. The responses of 9(15%) neurons increased only at the beginning of 100 ms and decreased greatly in the next 200 ms. In 15(26%) of IC neurons, when the pulses repetition rate was 90 pps, the responses increased only in the first several 10 ms and then reduced. There are 4(7%) neurons responding strongly only to the first pulse of 90 pps sound train. The present study suggests that the mechanism of IC processing temporal information of the sound repetition rate may be more complicated than that of the lower central auditory system.

### 关键词

GABA;  $GABA_A$ 受体( $GABA_A$  receptor); 串刺激重复率(Pulse repetition rate); 回声定位(Echolocation)