

第28回 最先端脳科学セミナー

Neuronal encoding of anxiety in the bed nucleus of the stria terminalis

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場所: 日医工オーデトリウム (医薬イノベーションセンター1F)

要旨

The bed nucleus of the stria terminalis (BNST) is important for anxiety behavior and its activity is associated with increased anxiety. However, how individual BNST neurons encode anxiogenic stimuli is unclear. Here, we employed in vivo calcium imaging and optogenetics in freely behaving mice and examined the neuronal encoding of anxiety in the BNST. First, we obtained calcium imaging from CaMKII-expressing BNST neurons. The mice were exposed to the elevated plus maze (EPM). Some BNST neurons preferentially increased their activity in open arms, and others preferentially increase their activity in closed arms, suggesting that neurons encoding anxiogenic and anxiolytic stimuli are both present within BNST. Second, we tested whether prepronociceptin (PNOC)-expressing BNST neurons respond to either anxiogenic or anxiolytic stimuli. PNOC neurons were activated in open arms but not in closed arms, suggesting that they preferentially encode anxiogenic stimuli. Third, we explored the functional role of BNST PNOC neurons. Photoactivation of PNOC neurons decreased the time spent in open arms and the open arm entries in the EPM. These results suggest that BNST includes both neurons encoding anxiogenic and anxiolytic stimuli and that BNST PNOC neurons encode anxiogenic stimuli and promote anxiety-like behavior.

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