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Changes in multiunit activity pattern in cerebellar cortex associated to olfactory cues during sexual learning in male rats

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Highlights

- The cerebellum participates in olfactory processing.
- Olfactory stimulation with different odor activates the lobules 6a and 7 of the cerebellum.
- Successive trials of sexual experience increase the response evoked by the three types of olfactory stimuli.
- In sexually expert male rats, exposure to receptive female (RF) stimulus resulted in highest amplitudes.
- The amplitude of multiunit activity increases in the control group during the learning of sexual behavior.

Abstract: The cerebellum is a structure of the central nervous system which has been previously studied with different techniques and animal models and even humans, so it is associated with multiple functions such as cognition, memory, emotional processing, balance, control of movement, among others. Its relationship with sensory systems has already been explored, however, the role it plays in olfactory processing in the cerebellum is unclear. Several hypotheses have been proposed from work done in humans and animal models with neuroimaging and immunohistochemical techniques. Everything seems to indicate that the cerebellar function is of vital importance for the olfactory perception, being able to be controlling not only the olfactory aspect, but also the olfactory processing. In this study we analyzed the multiunit activity in the granular layer of the cerebellar vermis during olfactory stimulation: a session being sexually naive and during four sessions of sexual behavior learning. The amplitude was compared between male naive and sexual experts, as well as between olfactory stimuli.

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