Medical Xpress

Elucidating the neural basis for expression of estrous female odor preference in male mice

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Social behaviors, such as sexual and aggressive behaviors, are important for successful reproduction and territorial defense in mice as a social species. For adaptive and efficient exhibition of these behaviors, accurate sex, reproductive state, and other opponent characteristics-related information processing is essential.

Male mice reportedly prefer the odor of estrous females over that of non-estrous females (receptivity-based preference) and males (sex-based preference). However, the neural circuit control of these preferences has not been unraveled yet.

In this study, published in *Proceedings of the National Academy of Sciences*, the researchers focused on the medial amygdala, reportedly involved in social information processing, and investigated the role of estrogen receptor beta-positive (MeA-ERβ+) neurons that are widely distributed in this region.

Using genetically-engineered male mice (ERβ-iCre) in which MeA-ERβ+ neurons are selectively manipulatable, the researchers performed three main sets of experiments to compare receptivity- and sex-based preferences: fiber photometry recording of MeA-ERβ+ neuronal activity during social preference tests, assessment of how pharmacogenetic MeA-ERβ+ neuronal activity suppression affected preference behavior, and neuronal activity recording of the bed nucleus of stria terminalis (BNST), a primary MeA-ERβ+ neuronal projection site, during preference tests under pharmacogenetic suppression of MeA-ERβ+ neuronal activity.

The results revealed that MeA-ERβ+ neurons exhibit different roles for the two preference types. Specifically, an excitatory MeA-ERβ+ neuronal activity input to the BNST is required for receptivity-based preference, whereas the BNST neurons control sex-based preference independently of the MeA-ERβ+ neuronal excitation.

More information: Satoshi Takenawa et al, Activity of estrogen receptor β expressing neurons in the medial amygdala regulates preference toward receptive females in male mice, *Proceedings of the National Academy of Sciences* (2023). DOI: 10.1073/pnas.2305950120

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