

# The neural control of reproductive vs aggressive mounting



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Sexual behavior is essential for the survival and prosperity of all animal species. Past studies have shown that parts of the hypothalamus are important for sexual behaviors. However, our understanding of how sexual behaviors are coordinated at circuit-level are quite limited.

Mice use ultrasonic vocalization (USV) to communicate during social interaction, especially in male-female interaction. Utilizing USV recordings, we identified two different types of mounting behaviors in male mice: mounting with USVs and mounting without USVs.

To understand how two different mounting behaviors are represented across hypothalamic nuclei, we focused on medial preoptic area (MPOA) and ventrolateral subdivision of the ventromedial hypothalamus (VMHvl), which have been suggested to be important for mounting behaviors in male mice. Optogenetic manipulation of subpopulation of MPOA neurons showed MPOA is necessary and sufficient for mounting with USVs. On the other hand, optogenetic stimulation of VMHvl triggered mounting without USVs and inhibited naturally occurring USVs toward female mice. Together with fiber photometry and miniscope calcium imaging from both regions, we found two different types of mounting behaviors have distinct neural representation.

These data suggest that 1. Mice express same 'mounting behavior' in two very different context: mounting with USVs occurs with reproductive motivation with high activity in MPOA and mounting without USVs occurs with aggressive motivation with high activity in VMHvl and 2. We can utilize a USV recording as a readout to understand behavioral motivation of the mice.

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