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Exploring Gender Disparities in Memory Capacity: Insights into Varied Brain Circuit Utilization

Wednesday, September 25, 2024 9:40 AM (20 minutes)

Memory capacity refers to the limited quantity of information that short-term memory can hold, proposed by Miller to be around 7 +/- 2 elements. In contrast, long-term memory is believed to have an unlimited capacity, though this holds true primarily for information that can be rehearsed, rather than spontaneously encoded. In this study, we investigated the neurobiology of memory capacity during spontaneous encoding in female and male subjects.Employing a behavioral task to investigate object memory span in mice, we discovered that both female and male mice exhibit a short-term memory (STM) capacity of 6 objects. However, while male mice retain all objects in long-term memory (LTM), females remember only 4 objects when tested after 1 or 24 hours. Interestingly, STM is completely disrupted in male mice, but not in females, when subjected to a memory interference procedure. Through a combination of imaging techniques and brain manipulation approaches, we observed that female mice display increased activation of the ventral median thalamus (VMT), whereas males hyperactivate the dorsal hippocampus (dHP) when presented with 6 objects to remember. Notably, optogenetic or chemogenetic inhibition and activation of the VMT-dHP pathway in female and male mice, respectively, reverse the sex-dependent memory phenotype.
These findings highlight a subcortical-cortical circuit sensitive to biological sex differences, which regulates the amount of information spontaneously transferred from STM to LTM.

If you're submitting a poster, would you be interested in giving a blitz talk?

No

If you're submitting a symposium talk, what's the symposium title?

Understanding Memory: Implications from neuronal to clinical populations

If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

No

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