You're walking down the street and see a person in front of you: do you go in for an enthusiastic hug or an introductory handshake? To make this decision you need to remember first if you've met them before, and second, what that experience was. Neuroscientists have been collectively working to determine where in the brain social memories are stored and how these memories are integrated to help you decide appropriate social interactions. There is evidence in many animal species that the hippocampus actively tracks important social information and may influence behavior by sending this information to other brain regions. One possible downstream region is the medial prefrontal cortex. which is responsible for working memory. The medial prefrontal cortex is a particularly attractive candidate to receive this socially-relevant information from the hippocampus because its dysfunction causes social deficits seen in mouse models of autism spectrum disorders.

Here, we set out to determine the role of the ventral hippocampus connection to the medial prefrontal cortex in social interactions. As both of these regions and their connection are altered in a mouse model of an autism spectrum disorder, we wanted to define interruptions the projection, and determine if and how these changes effected their social behavior.

We found that increased activity of ventral hippocampal neurons that project to the medial prefrontal cortex cause deficits of social memory in autism mice. Reducing the activity of these neurons in the autism mice specifically rescued their social memory, but did not influence any other ways they interacted with other mice. In wild-type mice, this projection regulates social memory in a fashion that was specific to the ventral hippocampal to medial prefrontal projection as opposed to other hippocampal projections, and selective to social interactions as opposed to interactions with objects or spatial memory.

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