

Neural mechanisms of social transmission of fear

Results:

In addition to learning signs associated with specific threats, animals can use con-specific alarm signals (such as alarm pheromones and calls) and eavesdrop on other species. These mechanisms allow animals to avoid the necessity of learning through what might be a fatal encounter with a predator. Our laboratory has recently shown that rats use freezing as a signal of threat. In our study, we trained one rat, the demonstrator, to fear a tone cue and the next day tested their fear of the cue in the presence of the cage-mate, the observer. We found that observer rats perceive the cessation of movement-evoked sound (caused by freezing of the demonstrator) as a signal of danger and its resumption as a signal of safety. In addition, we have found that observer rats previously exposed to footshocks display observational freezing, but naive observer rats do not, indicating that learning from self-experience with an aversive event is important for rats to respond to freezing displayed by others. We hypothesize that rats learn to associate their own freezing response with the aversive shock, such that later on freezing itself becomes an alarm cue. Indeed, experiments in the lab have shown that exposure to shock, or contextual fear learning in the absence of freezing, are not sufficient to allow for observational freezing. This set of experiments paved the way to the underpinnings of the neural mechanism underlying social transmission of fear in rats.

Published Work:

Pereira, A. G., Cruz, A., Lima, S. Q., & Moita, M. A. (2012). Silence resulting from the cessation of movement signals danger. *Current Biology*, 22(16), R627-R628.

Areas of interest:

Behavioral Neuroscience

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