

# Thinking crickets -- 'cognitive' processes underlie memory recall in crickets

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Activation of two different kinds of neurons is necessary for appetitive and aversive memory recall in crickets. Researchers writing in the open access journal *BMC Biology* blocked octopaminergic (OA-ergic) and dopaminergic (DA-ergic) transmission and found that this resulted in the inability to recall pleasant and unpleasant memories, respectively.

Makoto Mizunami (now at Hokkaido University, Japan) led a team of researchers from Tohoku University, Japan, who carried out the tests. He said, "This is the first study to suggest that classical conditioning in [insects](#) involves neural mediation between an originally neutral stimulus and a pleasant or unpleasant stimulus and the activation of these neural responses for memory recall. Such neural responses are often called cognitive processes in classical conditioning in higher vertebrates".

Mizunami and his colleagues previously reported that, in crickets, OA-ergic [neurons](#) and DA-ergic neurons convey signals about reward and risk, respectively. In this report, they found that blockers of synaptic transmission from OA-ergic and DA-ergic neurons prevented the insects from recalling which stimuli were related to the reward, and, therefore, could be approached, and which stimuli were related to the risk, so should be avoided. According to Mizunami, "These findings are not consistent with conventional neural models of classical conditioning in insects. Instead, we suggest that the cognitive account of classical conditioning proposed for higher vertebrates is applicable to insects".

[More information:](#) Roles of octopaminergic and dopaminergic neurons

in appetitive and aversive [memory recall](#) in an insect, Makoto Mizunami, Sae Unoki, Yasuhiro Mori, Daisuke Hirashima, Ai Hatano and Yukihiisa Matsumoto, **BMC Biology** (in press), [www.biomedcentral.com/bmcbiol/](http://www.biomedcentral.com/bmcbiol/)

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