MEETING ABSTRACT

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Modulation of survival circuits in extinction of conditioned fear
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Background: Emotions control evolutionary conserved behaviour that is central to survival in a natural environment. Although neurobiological substrates of emotionally controlled circuitries are increasingly evident, their mutual influences are not.

Methods: Here we employed Pavlovian fear conditioning and ex vivo slice electrophysiology to investigate interactions between hunger and fear, two life-sustaining survival circuits.

Results: In mice, fasting before fear acquisition specifically impaired long-term fear memory, while fasting before fear extinction facilitated extinction learning. Accordingly, genetic deletion of a feeding-relevant gene that reduces appetite, the Y₄ receptor gene, completely impaired fear extinction, a phenomenon that was rescued by fasting. Facilitated feed-forward inhibition between the basolateral and central amygdala, a synaptic correlate of fear extinction involving the medial intercalated cells, was absent in Y₄ knockout mice. Fasting before extinction learning, however, re-established facilitated feed-forward inhibition in these mice.

Discussion: Hence, consolidation of fear and extinction memories is differentially controlled by hunger.

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