

The role of noradrenergic transmission in the basolateral amygdala for the enhancement of memory consolidation induced by predator odour exposure

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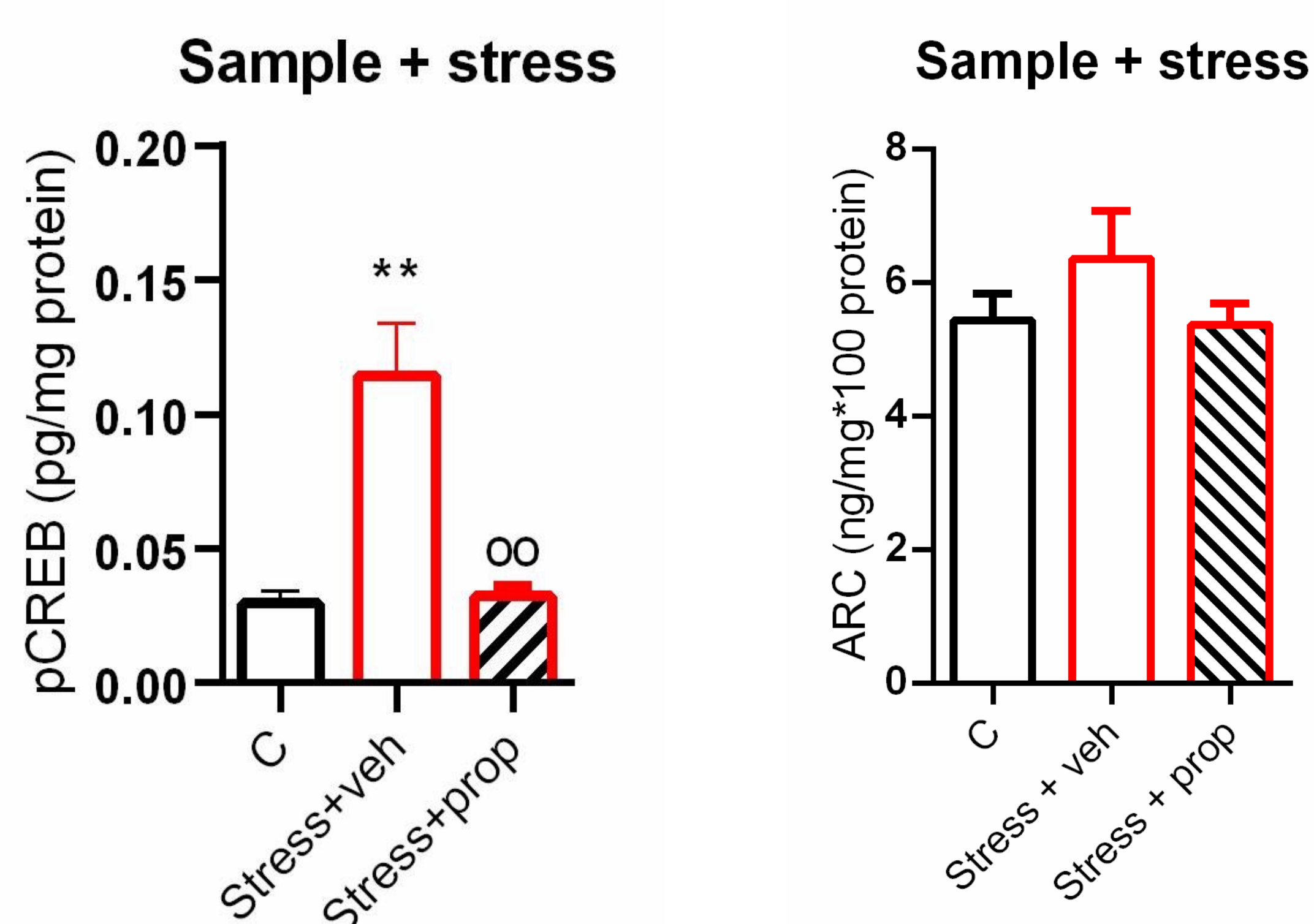
Background

The Memory Modulation Hypothesis proposes a pivotal role of noradrenergic transmission in the basolateral amygdala (BLA) for the emotional modulation of the consolidation of episodic-like memories in the hippocampus (Roozendaal and McGaugh, 2011). However, most of the studies examining the role of BLA in memory modulation are employing direct injection of noradrenaline (NA) or different agonists of the adrenoreceptors. Here, we decided to study the role of BLA in the enhancement of hippocampal-dependent memory by pairing the object-location task (OLT) with the exposure to a natural aversive stimulus (coyote urine) to hypothetically induce greater levels of endogenous NA. Immediately after the exposure, the animals were injected with vehicle or the non-selective beta blocker propranolol in the BLA.

Design of the behavioral experiments

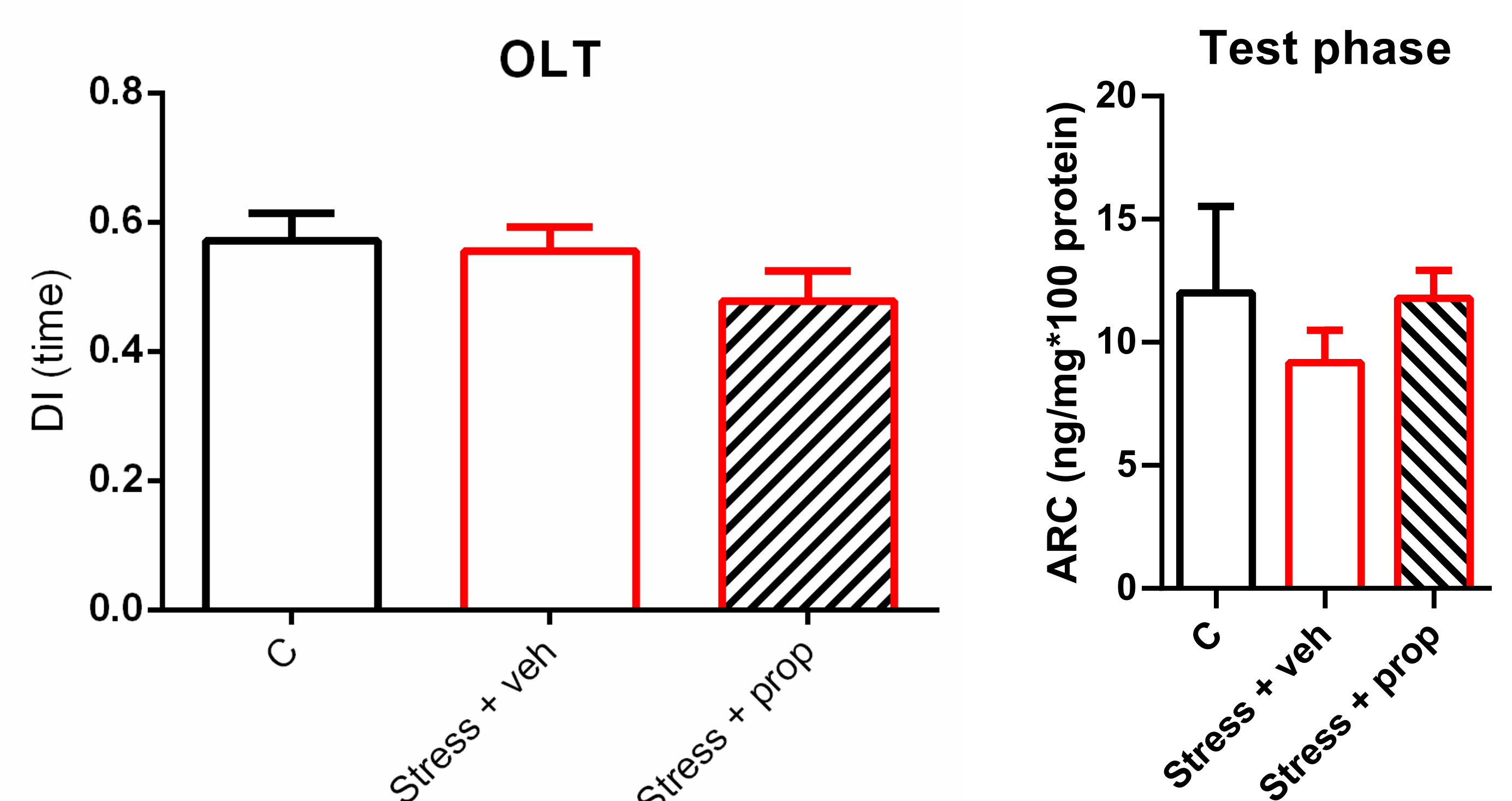


Experiment 1



Both hippocampi were collected 90 minutes after the exposure to the predator odor or 90 minutes after the sample session. Levels of pCREB and ARC were detected through ELISA.

Experiment 2



The discrimination index used for calculating the performance of each animal is the following: $\text{Novel}/(\text{Novel} + \text{Familiar})$. Both hippocampi were collected 90 minutes after the choice session.

Summary

The molecular and cellular processes required for initial consolidation of a memory for non-salient event are thought to be enhanced by the appearance of another temporarily proximal emotionally arousing event. Our first experiment demonstrates a tendency for potentially elongated consolidation phase induced by the aversive event and represented by the greater levels of pCREB in the animals that were exposed to the predatory scent, but were not injected with propranolol. However we failed to observe a significant effect on the performance of the animal during the test phase of the task. More experiments should be conducted in the future to establish if factors like contextual pre-exposure could influence the connectivity between the BLA and the HPC and minimize the effects of emotional arousal on memory.

Reference: Roozendaal, B., McGaugh, J.L., 2011. Memory modulation. *Behavioral Neuroscience* 125, 797–824. <https://doi.org/10.1037/a0026187>

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No potential conflict of interest.