

Nitric oxide is necessary for labilization of a consolidated context memory during reconsolidation in terrestrial snails

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Abstract

© 2014 Federation of European Neuroscience Societies and John Wiley & Sons Ltd. Nitric oxide (NO) is known to be involved in associative memory formation. We investigated the influence of blocking NO function on the reconsolidation of context memory in terrestrial snails (*Helix lucorum* L.). After a 10 day session of electric shocks in one context only, context memory in snails was observed in test sessions as the significant difference of amplitudes of withdrawal responses to tactile stimuli in two different contexts. After a 1 day rest, a session of 'reminding' was performed, preceded by injection in different groups of the snails with either vehicle or combination of the protein synthesis blocker anisomycin (ANI) with one of the following drugs: the NO scavenger carboxy-PTIO, the NO-synthase inhibitors N-omega-nitro-L-arginin, nitroindazole and NG-nitro-L-arginine methyl ester hydrochloride, or the NO donor S-nitroso-N-acetyl-DL-penicillamine. Testing the context memory at different time intervals after the reminder under ANI injection showed that the context memory was impaired at 24 h and later, whereas the reminder under combined injection of ANI and each of the NO-synthase inhibitors used or the NO scavenger showed no impairment of long-term context memory. Injection of the NO donor S-nitroso-N-acetyl-DL-penicillamine with or without reminder had no effect on context memory. The results obtained demonstrated that NO is necessary for labilization of a consolidated context memory. After a 10-day session of electric shocks in one context only, context memory in snails was observed in test sessions as the significant difference of amplitudes of withdrawal responses to tactile stimuli in two different contexts. A session of 'reminding', preceded by injection either with vehicle, or combination of a protein synthesis blocker anisomycin (ANI) with one of the NO-synthase inhibitors has shown that the context memory was impaired, while the reminder under combined injection of ANI and each of the NO-synthase inhibitors used or the NO scavenger showed no impairment of long-term context memory. Obtained results demonstrate that NO is necessary for labilization of a consolidated context memory.

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Keywords

Animal model, Behavior, *Helix lucorum*, Invertebrates, Learning