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Presentation Abstract

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Title: Activation of noradrenergic neurons in locus coeruleus in a T-maze choice task with different difficulties

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Authors: ***S. AMEMIYA**, N. KUBOTA, T. OTSUKA, T. NISHIJIMA, I. KITA;
Tokyo Metropolitan Univ., Hachioji, Tokyo, Japan

Abstract: In difficult choice situation, there are higher demands for exploration and assessment of preferences for optimal decision-making. Previous studies reported that activity of noradrenergic neuron in locus coeruleus (LC) modulates exploration state, in which subjects search for behaviors fitting to task rules. Furthermore, alpha2 receptor antagonist, idazoxan, which increases the release of noradrenaline (NA), facilitates attentional shift and consequently guides rapid optimization of behavior in choice tasks. Therefore, we hypothesize that the more difficult a choice condition is, the more noradrenergic neurons are activated for optimization of choice behavior. To examine this hypothesis, we examined performances of T-maze two-alternative choice task with different difficulties and activation of noradrenergic neuron in LC by double-labeling immunohistochemistry in rats. We manipulated difficulty of the task by varying the degree of discriminability between choices (reward pellets between two arms; 0 vs 4, 1 vs 3, 2 vs 2). The data showed that as the discriminability diminished, choice bias to one side arm was reduced and time to enter one of two arms was prolonged. In terms of neuronal activity, we observed that noradrenergic neurons are activated depending on decreasing of the discriminability. These results suggest that noradrenergic neurons in LC were activated depending on the task difficulty. It is, thus, possible that noradrenergic neurons in LC have a role in difficult choice situation to explore information for optimal decision-making.

Disclosures: **S. Amemiya**, None; **N. Kubota**, None; **T. Otsuka**, None; **T. Nishijima**, None; **I. Kita**, None.

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CHOICE

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