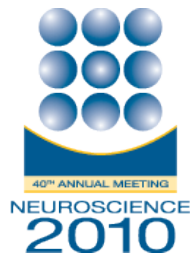


[Print this Page](#)

Presentation Abstract

Program#/Poster#: 905.3/KKK1

Title: Activation of amygdala neurons is involved in yawning responses induced by fear conditioning in rats

Location: Halls B-H

Presentation Time: Wednesday, Nov 17, 2010, 3:00 PM - 4:00 PM

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

Abstract: Yawning is often observed in not only the states of boredom and drowsiness, but also a stressful situation. Previous studies have shown that administration of anxiogenics, which can induce anxiety-like behaviors such as freezing, grooming and scratching, potentially results in increase of yawning responses. Yawning responses accompanied with anxiety-like behavior could be mediated by activity of the amygdala, since the anxiety-like behavior is generally involved in emotion and stress responses. We have previously reported that activation of not only oxytocin (OT) neurons but also corticotropin-releasing factor (CRF) neurons in the hypothalamic paraventricular nucleus (PVN) is responsible for yawning responses. CRF neurons are generally known to play a critical role in various stress responses related to anxiety or fear. Thus, it is possible that yawning in the state of anxiety or fear is involved in neuronal activities in the amygdala as well as the PVN. In this study, we examined whether activation of neurons in the central nucleus of the amygdala (CeA) is involved in yawning responses induced by fear conditioning with c-Fos immunohistochemistry in freely moving rats. For the fear conditioning, rats were placed in a conditioning box with electrical foot-shock (0.8 mA, 3 sec, 5 times) once 1 day before the experiment. We counted the number of yawning by direct observation for 60 min in the open-field box after a placement of rat in the same conditioning box without foot-shock. To evaluate fear- or anxiety-like behavior, we counted the number of entries into the center and lines crossed during the open-field test. Furthermore, we investigated the effect of chemical stimulation (L-glutamate, 2-5 nmol) of the CeA on yawning responses in anesthetized, spontaneously breathing rats. In the fear-conditioned rats, the number of yawning was significantly higher than control rats, i.e., no fear conditioning, as well as fear- or anxiety-like behavior. These results of behavioral observation seemed to be associated with c-Fos expression in the CeA and PVN OT neurons. In addition, microinjection of L-glutamate into the CeA induced yawning responses. These findings suggest that activation of amygdala neurons might be involved in the induction of yawning responses by fear conditioning.

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

Keyword(s): fear conditioning
amygdala
yawning

[Authors]. [Abstract Title]. Program No. XXX.XX. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.

2010 Copyright by the Society for Neuroscience all rights reserved. Permission to republish any abstract or part of any abstract in any form must be obtained in writing by SfN office prior to publication.