

Investigation of the neural mechanism of reminiscence using nostalgic odor

Kentaro Oba

Institute of Development, Aging and Cancer, Tohoku University

Recently, odor-evoked nostalgia gets a lot of attention from the field of both social psychology and psychological therapy, since it has positive psychological functions such as mood increment. Thus far, however, the precise neural mechanisms have not been demonstrated. We hypothesized that 1) retrieval of nostalgic memories have rewarding value and is associated with ventral striatum activity, 2) nostalgic odor has physiological effect and is associated with hypothalamus activity, and 3) the combination of nostalgic memory and odor has synergistic effect and is represented in the hippocampus as the interaction. In the current study, we addressed these hypotheses using functional magnetic resonance imaging (fMRI). Sixteen right-handed healthy older adults ($M = 68.8$, $SD = 3.95$) who have normal olfaction participated in this study. Before the fMRI experiment, participants selected two nostalgic and two familiar odors and were interviewed by the experimenter about the autobiographical memory relevant to each odor. There were two factors (memory and odor) with two levels (nostalgic and familiar) in the experimental task. During fMRI participants were asked to remember each memory cued by short “title” which was created based on the memory interview and rate the vividness and pleasantness of the memory remembered. In the behavioral level, there was significant memory*odor interaction in both vividness and pleasantness. In the neural level, as expected, we found significant 1) main effect of memory on the left ventral striatum, 2) main effect of odor on the hypothalamus, and 3) interaction on the left hippocampus. These results may suggest the neural mechanism relevant to the role of nostalgic odor on the reminiscence activities.