

Pharmacological and physiological effects of plant-derived odor components on neurotransmission in brain

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A group of six-carbon straight-chain alcohols and aldehydes is called “green odor”, and contributes to make plants’ odors in vegetables and fruits. Previously, we reported that green odor compounds enhanced dopamine release from rat brain striatal slices and rat pheochromocytoma (PC12) cells, and also the dopamine release was enhanced in the brain striatum of living rats using brain microdialysis system. In addition, the dopamine release was contributed to intracellular and extracellular Ca^{2+} . The increment of extracellular dopamine concentration was also induced by inhibition of uptake to the cell. In this study, it was checked whether the dopamine release by *n*-hexanal, one of green odor compounds, was related to the dopamine uptake inhibition. The additive action of the dopamine release was detected by co-perfusion of *n*-hexanal and nomifensine, a dopamine uptake inhibitor. This data suggested that the *n*-hexanal-induced dopamine release was not related to dopamine uptake inhibition.

These data were stimulated by green odor directly. In this study, whether oral administration of *n*-hexanal to rats caused dopamine release as same as previous data or not was examined. Rats were planted a microdialysis probe into the striatum, and Ringer’s solution was perfused. The dopamine concentration in perfusates was measured by HPLC-ECD system. When the rat was oral administrated *n*-hexanal, the dopamine release was enhanced 120 min after the administration. Next, to check the effect of the dopamine release via olfactory system, the rat was received olfactory administration of *n*-hexanal for 5 min. However, the dopamine release enhancement was not detected. These data suggested that oral administration of *n*-hexanal enhanced dopamine release.