

Pharmacological 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 such as vegetables and fruits. Odor compounds are incorporated into the body through the skin, nose and mouth, and thereafter take in the blood stream and reach to the brain. Previously, it was reported that 6 kinds of green odor enhanced dopamine release from rat brain striatal slices and rat pheochromocytoma (PC12) cells. In this study, whether the dopamine release by green odor was caused in living rat was examined by rat brain microdialysis method. Rat was planted a microdialysis probe into striatum, and Ringer’s solution or odor samples that were diluted to 0.01% or 0.05% with Ringer’s solution were perfused. The concentration of released dopamine in perfusates was measured by HPLC-ECD system. When the brain striatum was stimulated by green odor, *n*-hexanal and *n*-hexanol, and 9-carbon aldehyde, *n*-nonanal, the released dopamine was significantly increased. To determine the relation with extracellular- or intracellular- Ca^{2+} concentration to the increase of the dopamine release, Ca^{2+} -free Ringer’s solution or BAPTA-AM including solution, membrane permeable Ca^{2+} chelator, was perfused to brain with *n*-hexanal. The dopamine release by *n*-hexanal was reduced under both intracellular- and extracellular- Ca^{2+} -free condition. These data suggested that green odor stimulated the dopamine release from living rat striatum, and this enhancement of dopamine release was caused by Ca^{2+} related mechanisms.