

Quantitative analysis on perfume; Studies on intensity and quality of perfume, structure-activity relationship, adaptation, and perfume sensor

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1. We measured the turtle olfactory bulbar responses to six pairs of hiely pure optical isomers. With all odorants tested, there was no difference in odor threshold and intensity in the whole concentration range examined between the optical isomers. The difference in odor quality between optical isomers greatly varied with species of odorants.
2. The ability of the olfactory receptors to discriminate odorants having similar structures was abolished by increasing temperature up to 40 °C, whereas discrimination of odorants having quite different structures was much less affected. The results suggested that the structures of the receptor sites for odorants are greatly affected by a fluidity change of the lipid layer of the receptor membranes. The results also suggested that desensitization (adaptation) occurs not at a cell level but at a receptor site level.
3. The membrane potential changes of liposome, which is a model for odor sensor, in response to odorants were measured with a voltage-sensitive fluorescence dye. The magnitudes of the responses to odorants greatly depended on membrane composition of liposomes. It was suggested that various odorants can be identified by the response patterns of liposomes having different compositions.