SINGLE OLFACTORY SENSORY NEURONS INTEGRATE SIMULTANEOUSLY SEVERAL COMPONENTS OF AN ODOR MIXTURE

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ABSTRACT

Most odors are complex mixtures. However the capacities of olfactory sensory neurons (OSNs) to process complex odor stimuli have never been explored in air-breathing Vertebrates. To face this issue, the present study compares the electrical responses of single OSNs to binary mixtures and their components in rats *in vivo* OSNs responses to increasing concentrations of two odor molecules, delivered singly and mixed together, reveal complex interactions between odor components and show that individual OSNs integrate the two molecular signals. Until now, this integration had never been experimentally demonstrated in mammals, nor described by exploring the whole concentration range over which OSNs can work. Our results further allow us to draw evident links between peripheral odor reception and central odor coding. They reveal rules that may govern dominating even masking actions of odor molecules in complex mixtures and explain how a minor component may be determinant in the final perception of the quality of that mixtures. OSNs are demonstrated as holding a crucial part of the final performances of the system, the sharpness of their individual coding abilities being fully evidenced with odor mixtures.

Keywords : olfaction, odor mixture, olfactory sensory neurons