BDR SEMINAR (Kobe & online hybrid)

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Wednesday, July 29, 2026

13:00-14:00

C501 Seminar room, DB Building C5F, Kobe / Broadcast online via Zoom

※This seminar is open only for BDR Members

Hunger selectively promotes food odor attraction

Summary

Odor information detected by receptors in the olfactory epithelium is sent to the brain, leading to appropriate behavioral outputs including attractive, avoidance, feeding, mating, and fighting behaviors. The choice of behavioral action is strongly influenced by physiological need for survival, and hunger is a powerful motivational state for eating. Hungry mice use olfactory information to find food sources, but sated mice would have less interested in food cues. However, mechanisms by which internal state changes olfactory behaviors remain unclear.

With a simple and robust two-choice behavior assay to investigate hunger dependent odor responses, we found that fasted mice preferred food odor to other olfactory cue, pheromone, whereas sated mice did not. The hypothalamic agouti-related peptide (AGRP) neurons are known to elicit strong hunger drive. Mice with optogenetics activation of AGRP neurons in the arcuate nucleus showed food odor preference even in sated state. AGRP neurons send axons in many brain regions and release three principal neurotransmitters, AGRP, neuropeptide Y (NPY) or GABA (γ-aminobutyric acid). When each terminal was activated, mice showed food odor preference only with activation of paraventricular thalamus (PVT). In addition, NPY and its receptor NPY5R knockout mice did not show food odor preference in fasted state.

These data suggested that NPY from AGRP neurons modulate food odor preference in a state dependent manner with a function of NPY5R in PVT. Moreover, we uncovered the molecular features that are essential for selective odor preference state-dependently.

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