

生命科学セミナー

How does expansion of olfactory sensory neuron population influence perception and behaviour?

嗅覚神経細胞の数の増加は
嗅知覚・行動にどのように影響するのか？

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Comparative neurobiology is a powerful approach to study the evolution of neural circuits and behaviour as well as to shed light on general principles of circuit function. In this seminar, I will mainly talk about the functional impact of sensory neuron population expansion. The evolutionary expansion of sensory neuron populations detecting important environmental cues is widespread, but functionally enigmatic. We investigated this phenomenon through comparison of homologous olfactory pathways of *Drosophila melanogaster* and its close relative *Drosophila sechellia*, an extreme specialist for *Morinda citrifolia* noni fruit. *D. sechellia* has evolved species-specific expansions in select, noni-detecting olfactory sensory neuron (OSN) populations, through multigenic changes. Activation and inhibition of defined proportions of neurons demonstrate that OSN population increases contribute to stronger, more persistent, noni-odour tracking behaviour. These sensory neuron expansions result in increased synaptic connections with their projection neuron (PN) partners, which are conserved in number between species. Surprisingly, having more OSNs does not lead to greater odour-evoked PN sensitivity or reliability. Rather, pathways with increased sensory pooling exhibit reduced PN adaptation, likely through weakened lateral inhibition. Our work reveals an unexpected functional impact of sensory neuron expansions to explain ecologically-relevant, species-specific behaviour.

(発表スライドは英語表記、発表は日本語で行われます)

連絡先 細胞認識学分野、生命情報解析教育センター (CeLiSIS)

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