

外国人学識者招聘プログラム

Loss of sweet taste in birds and re-evolution of sweet taste in hummingbirds

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場所： **明治大学生田キャンパス**

第一校舎6号館208号室

講義概要：

Animals often evolve unique and specific adaptations to thrive in particular environmental niches. The evolution of sweet taste preference in nectar feeding birds provides a powerful model system for understanding molecular mechanisms underlying such phenotypic adaptation. In mammals, sweet taste reception is mediated by a G protein-coupled receptor complex; however, the gene encoding one subunit of the mammalian sweet receptor (T1R2) has not been detected in any bird genome, suggesting loss in the avian common ancestor. Nevertheless, some bird species, such as hummingbirds, display high behavioral affinity for sugars found in nectar. To understand the molecular basis of sugar sensing in hummingbirds, we cloned taste receptor orthologs from oral tissue of hummingbirds, swifts, and chickens. We identified a taste receptor that serves as a functional carbohydrate receptor in hummingbirds but not in swifts and chickens, providing strong evidence for neofunctionalization within the peripheral taste system. Moreover, we pinpointed key mutations that occurred in the hummingbird lineage and enable sugar recognition. Behavioral choice tests and high speed videography in wild and captive hummingbird populations indicated sweet taste preferences that correlated with in vitro functional studies. Thus, we describe a new sweet taste detection mechanism that evolved in hummingbirds since divergence from swifts, and more generally, provide a molecular mechanism for the adaptive evolution of a novel behavior.

先生方・学部生・大学院生・学外の方のご来聴を歓迎します。

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