



## Generating genetic tools in ants to study behavior and neural development

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The chemosensory system plays a crucial role in establishing and maintaining social structure in eusocial insects. Ants exhibit cooperative behaviors with an extensive dependency on communication. The perception of cuticular hydrocarbons (CHCs) as pheromones is mediated by odorant receptor neurons (ORNs). ORNs express specific odorant receptors (ORs) encoded by a dramatically expanded *Or* gene family in ants. The biological features in a few ant species, such as *Harpegnathos saltator*, allow CRISPR-Cas9 gene targeting to generate a germline mutation. This facilitates the genetic analysis of the *orco* gene that encodes the obligate co-receptor whose mutation should significantly impact ant olfaction. Our results show that *Orco* exhibits a conserved role in the perception of general odorants but also a role in reproductive physiology and social behavior plasticity in ants. Surprisingly, and in contrast to *Drosophila*, the loss of OR functionality also dramatically reduces the development of ant ORNs and antennal lobe glomeruli. Taken together, developing genetic tools in eusocial insects will facilitate the functional analysis of genes in the regulation of complex sociality.