

One Big, Smelly Family: Decoding the Olfactory Receptors in the Indian Jumping Ant



The Society for
Integrative &
Comparative Biology
2020 Annual Meeting

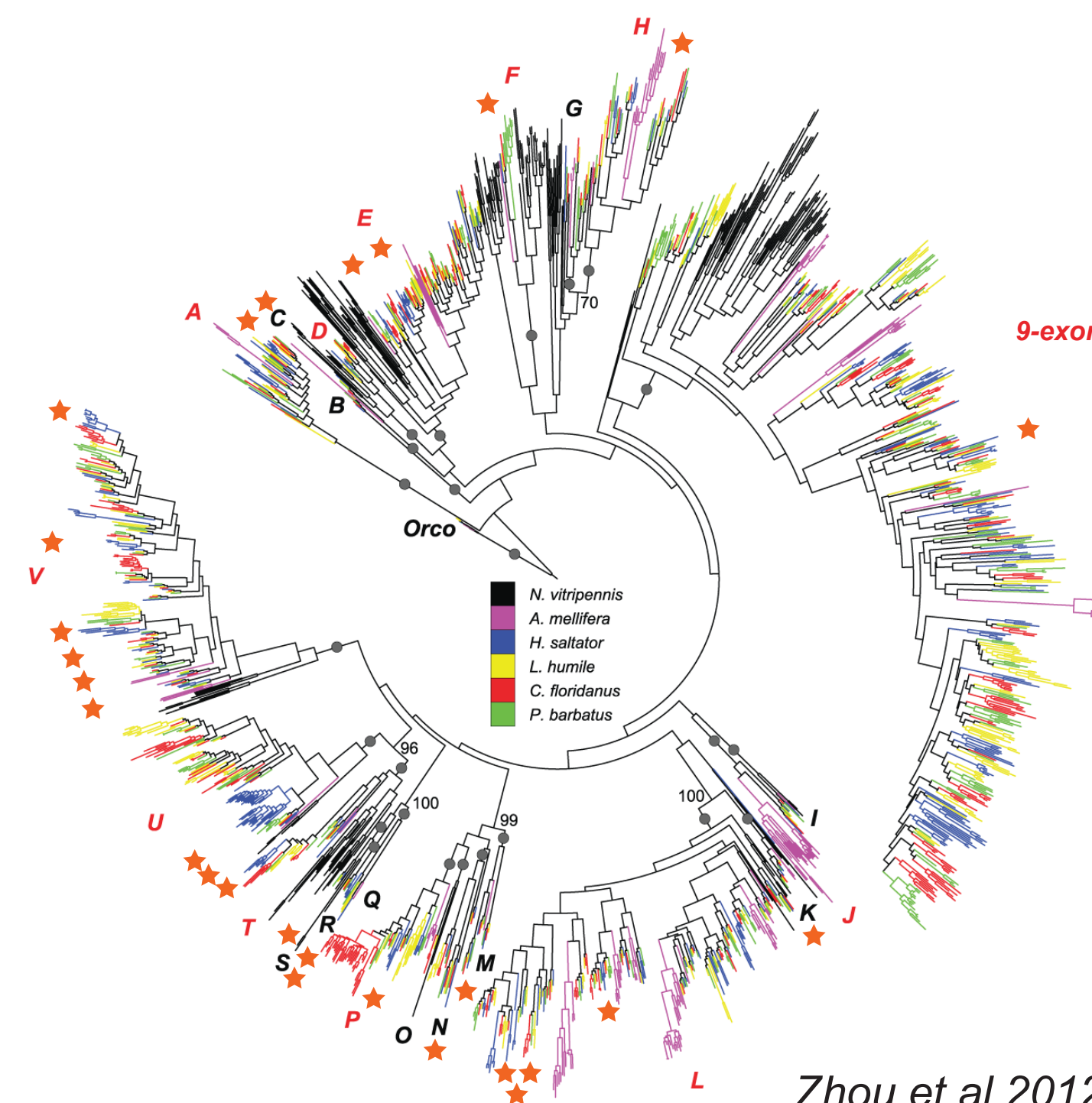
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H. saltator as a model for chemical communication

- Eusocial insects rely on the olfactory detection of cuticular hydrocarbons (CHCs) for social communication.

- *H. saltator* is a primitively eusocial ant that exhibits a unique social hierarchy.



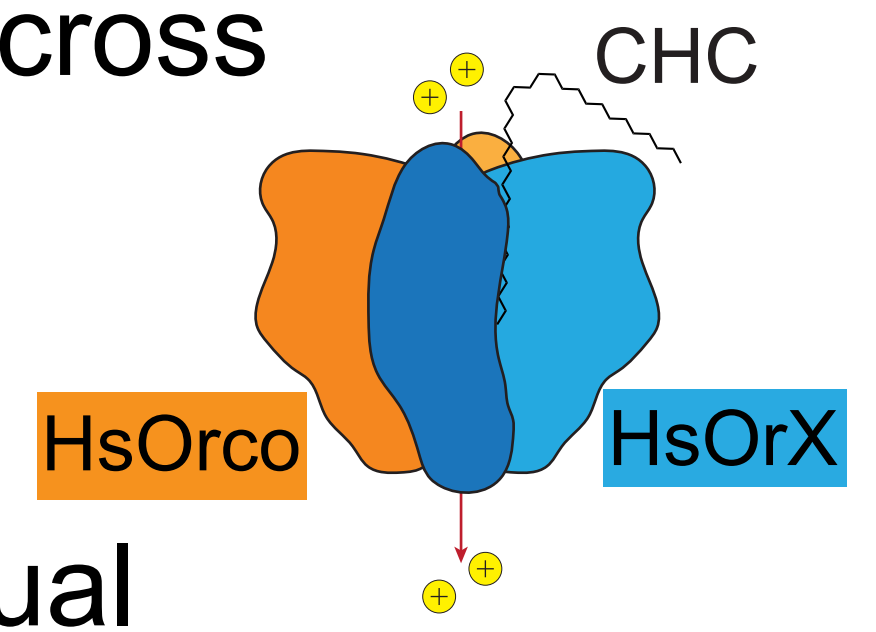
Zhou et al 2012 PLOS Genetics

Ants use a large family of 347 odorant receptors for detecting social cues and other odorants

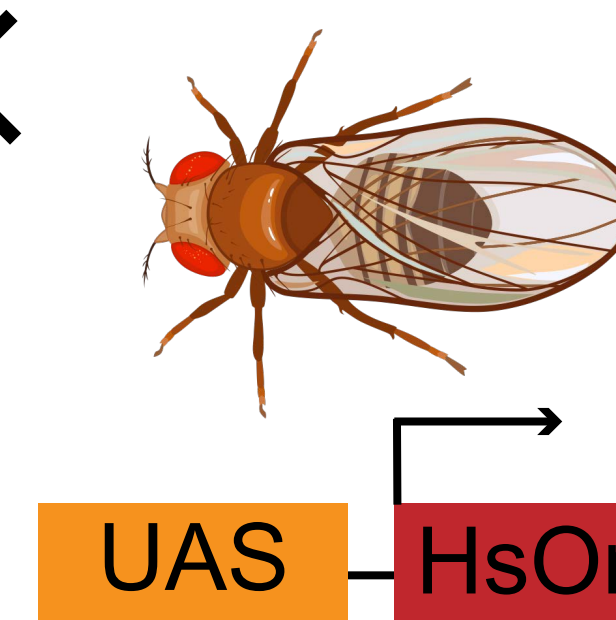
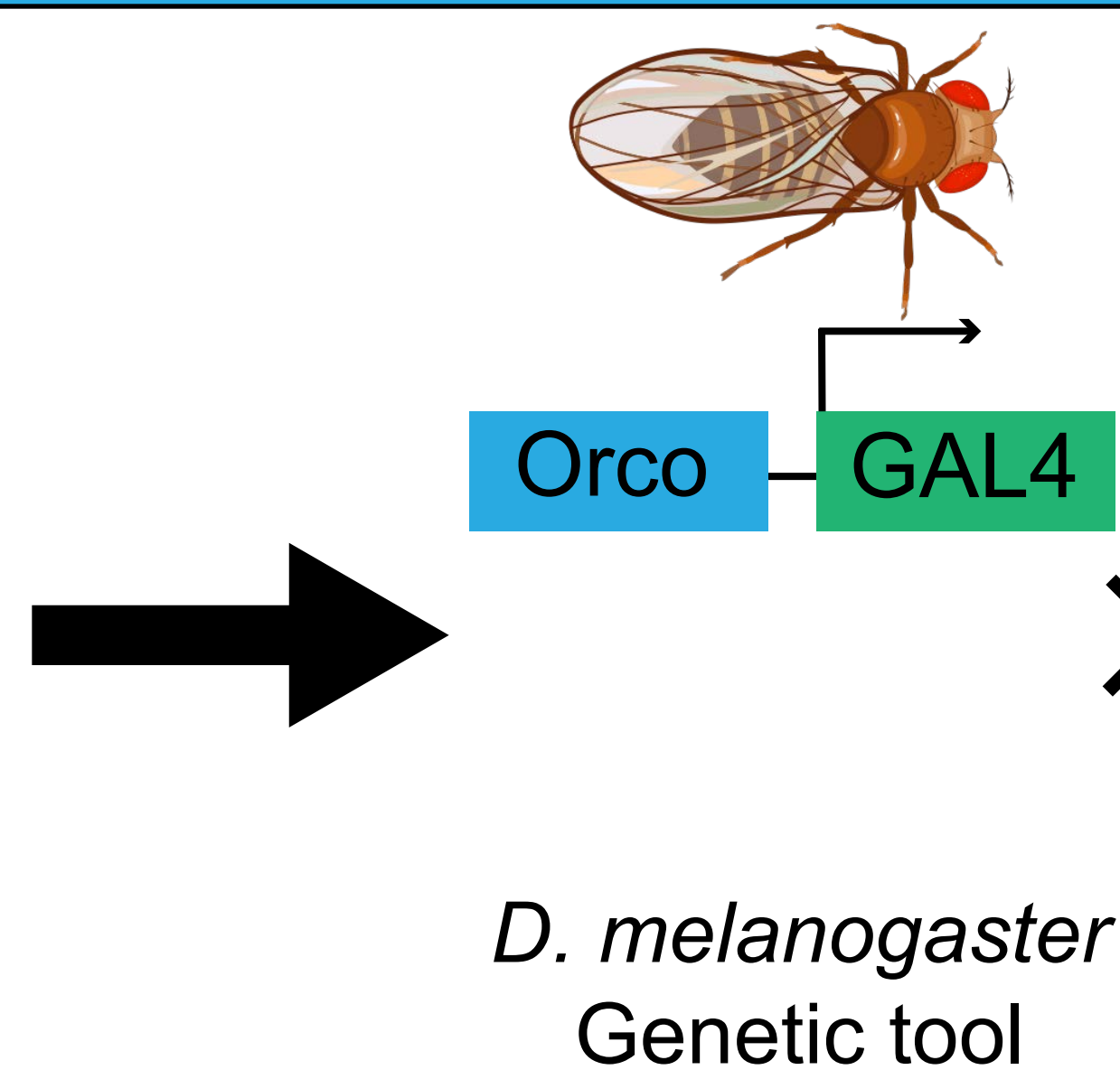
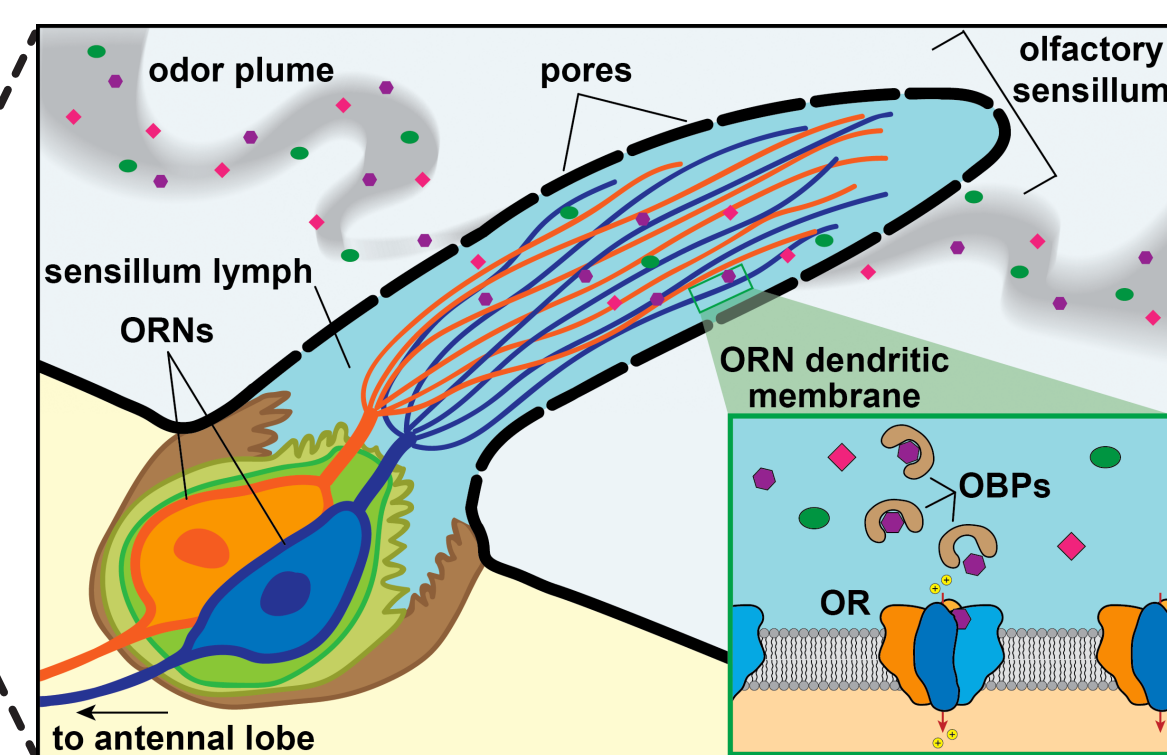
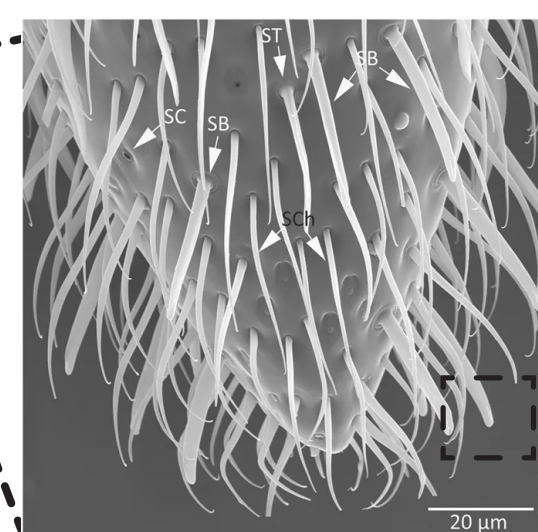
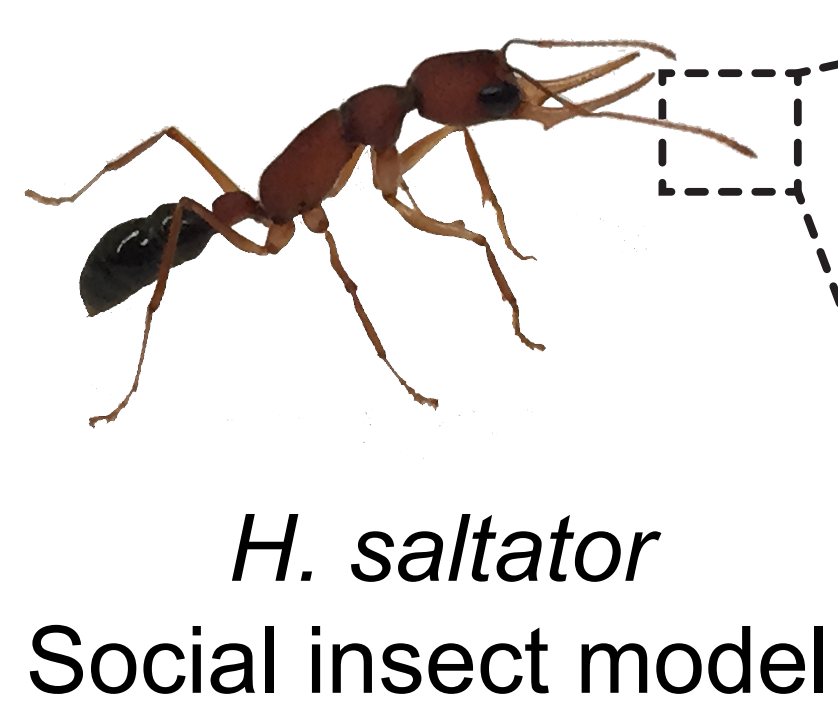
Research Objectives

- Analyze the function of odorant receptors across the broad family

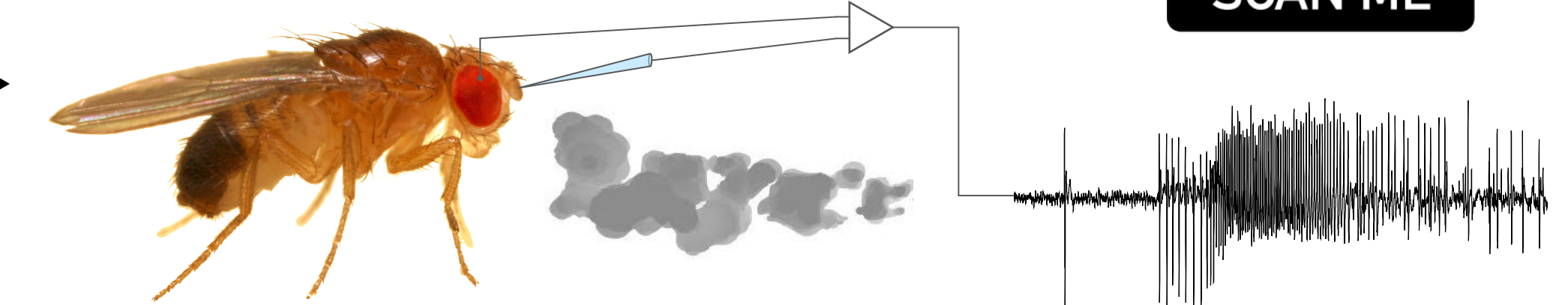
- Characterize the sensitivity of individual ORs to various CHCs



Project Workflow

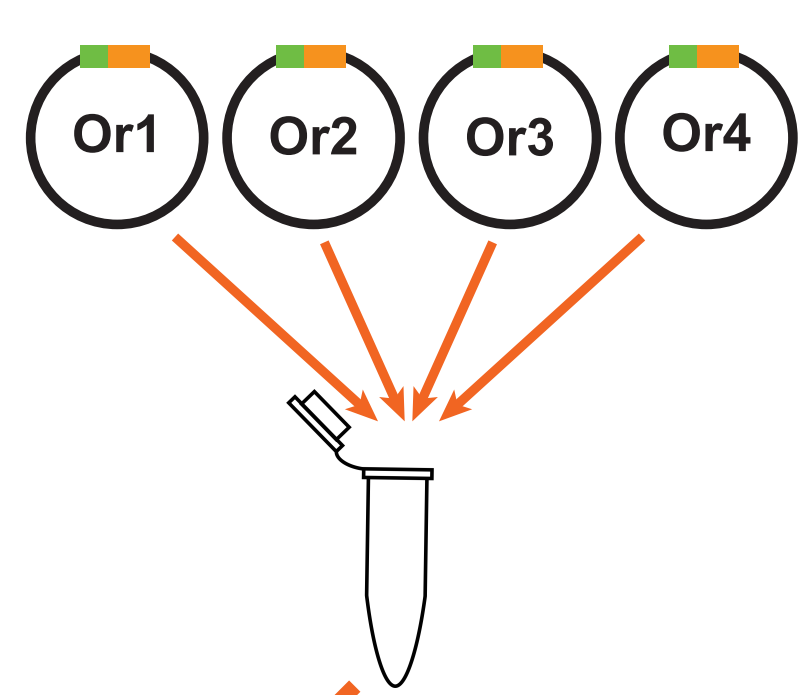


Want a glimpse into fly electrophysiology?



Neuronal response to CHC odor

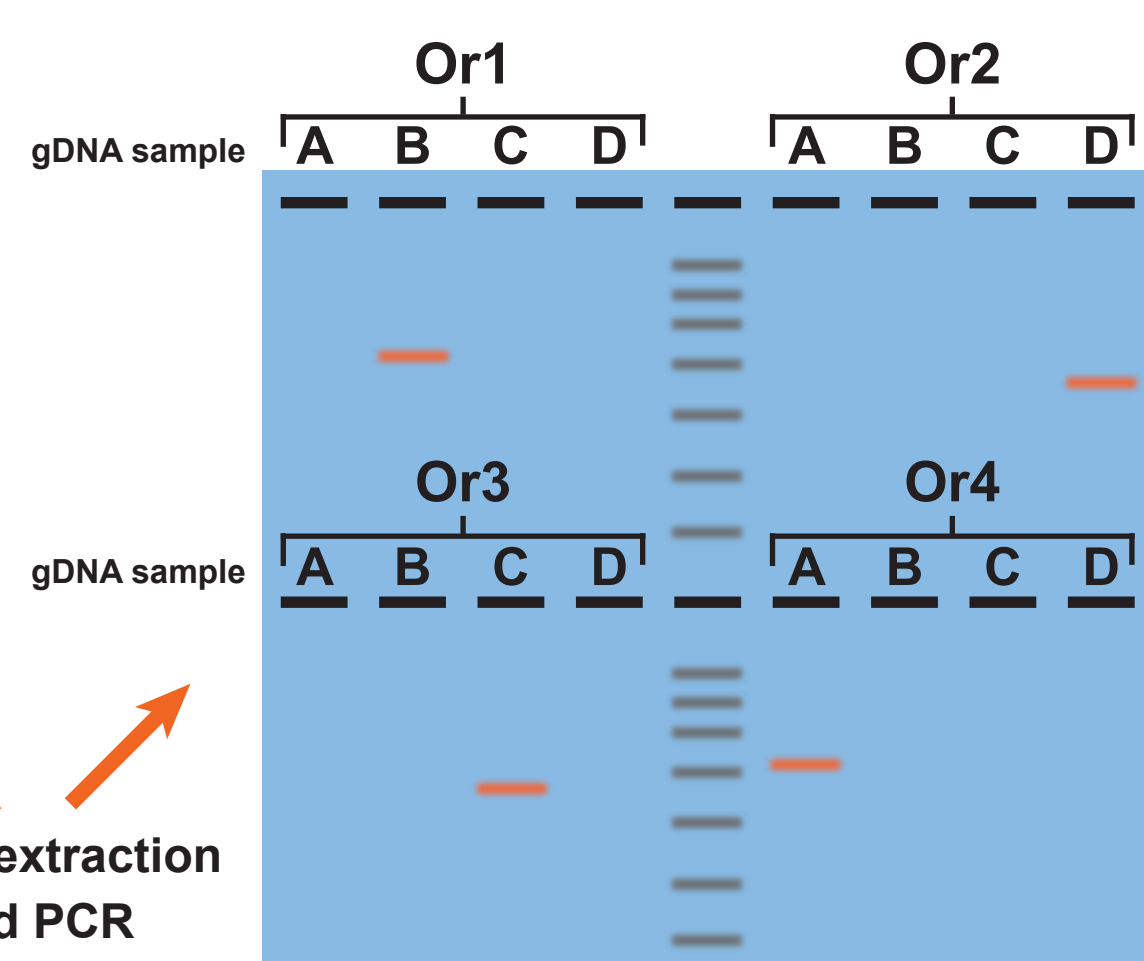
Confirmation of HsOr Insertion



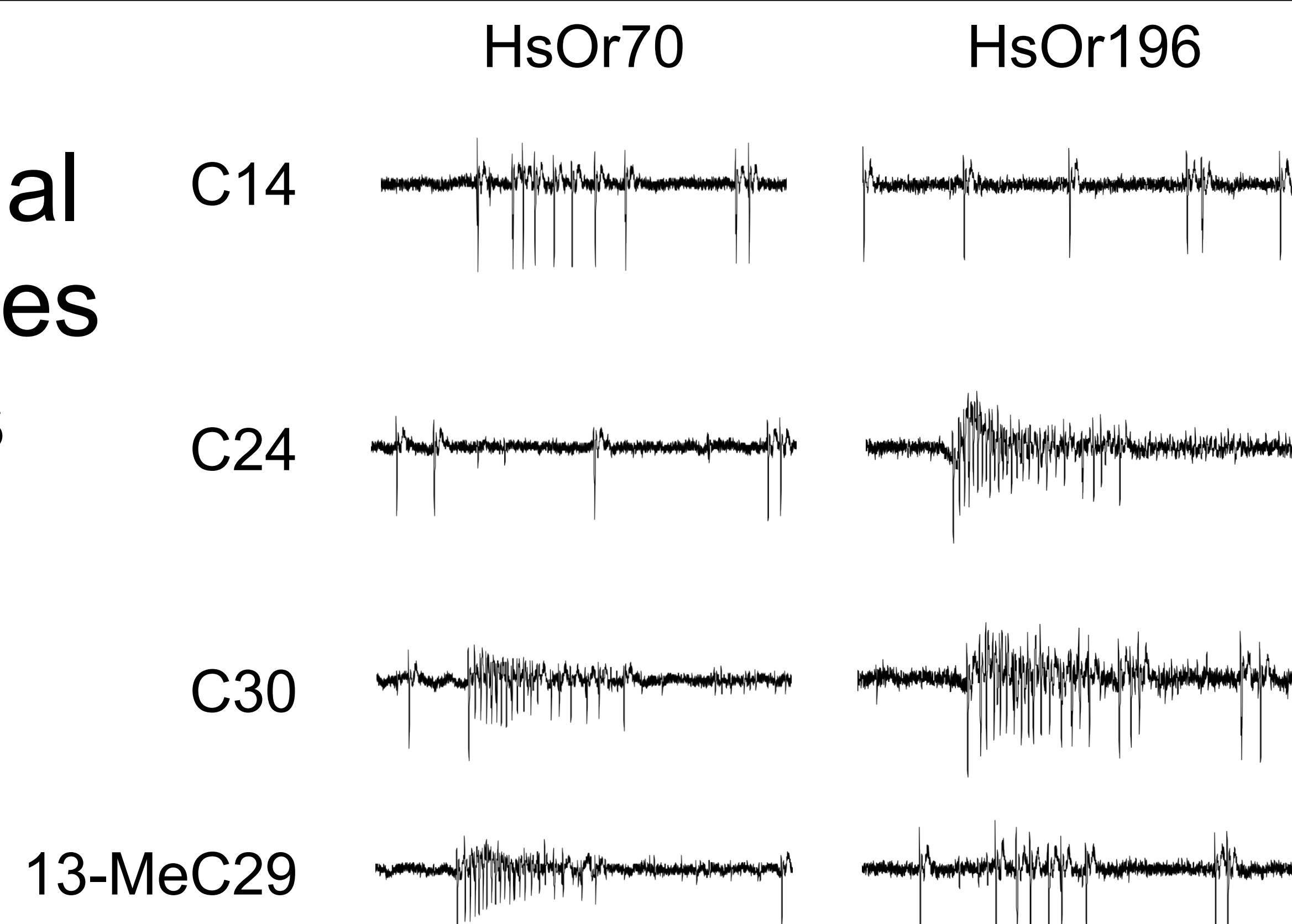
Injection

Isolation of transformants

gDNA extraction and PCR



Functional Differences Across HsOrs



Research Outcomes

- Identify novel CHC ligands for the largest number of ORs characterized in any insect
- Understand the basic requirements for eusocial communication
- Enables future studies on OR conservation across species

References

Pask et al. Specialized odorant receptors in social insects that detect cuticular hydrocarbon cues and candidate pheromones. Nat Comm 17; 8(1): 297 (2017).
Zhou, X. et al. Phylogenetic and transcriptomic analysis of chemosensory receptors in a pair of divergent ant species reveals sex-specific signatures of odor coding. PLoS Genet 8, e1002930 (2012).
Ghaninia et al. Chemosensory sensitivity reflects reproductive status in the ant Harpegnathos saltator. Nature Scientific Reports 7; 3732 (2017)

Acknowledgements

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