Neuronal basis of pheromone perception in mosquitoes

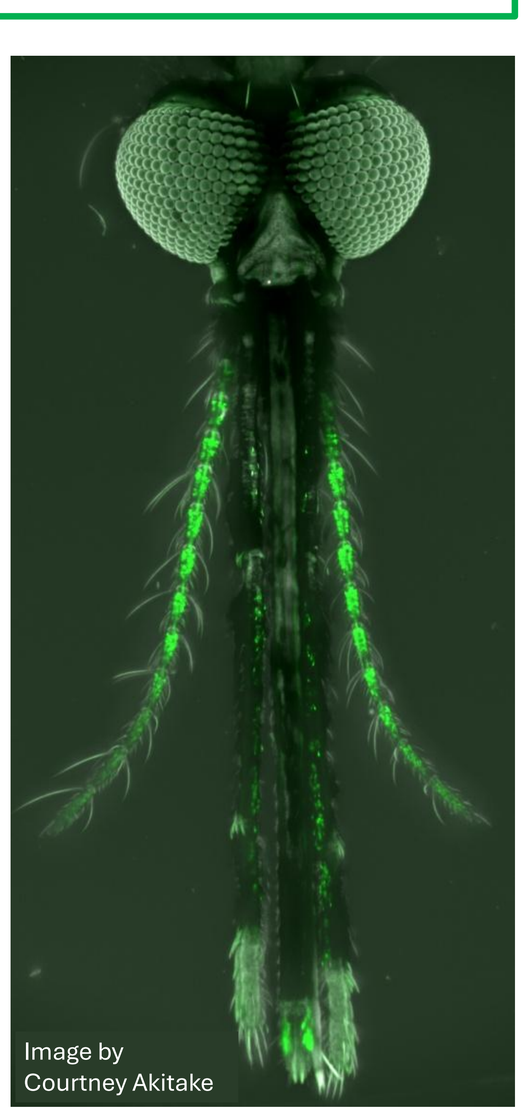
Iman J Muktar, Olena Riabinina

Department of Biosciences, Durham University, Durham, DH1 3LE, UK

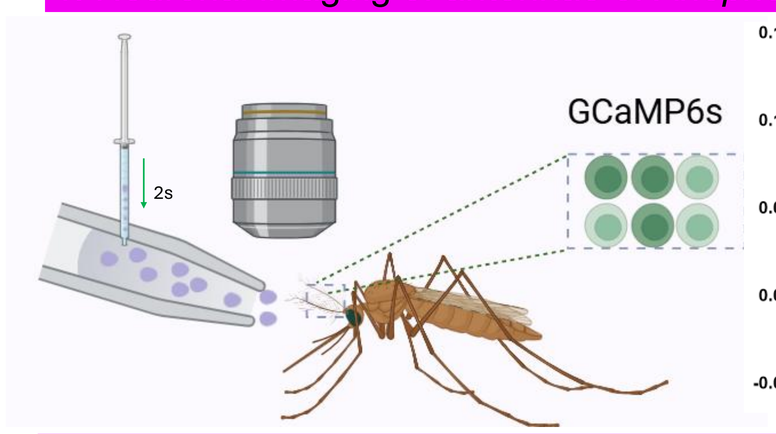
Background & Introduction

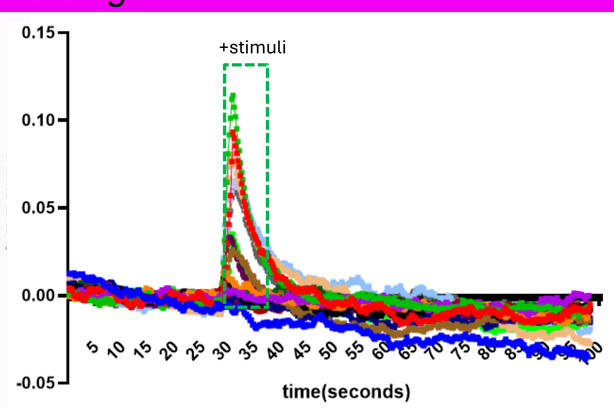
Anopheles gambiae is the primary vector sub-Saharan Africa. This mosquito relies on olfactory cues to mediate key behaviours, including host-seeking, feeding and oviposition. However, the ongoing debate in the field is whether/or not mosquitoes use pheromones for aggregation and mate recognition.
Here, we use candidate mosquito-derived compounds and *in vivo* calcium imaging from olfactory neurons to establish whether mosquitoes perceive candidate pheromones.

Aims:
1. Image olfactory appendages (antennae, maxillary palps and proboscis) and record responses of ORCO-positive and IR76b-positive cells to candidate pheromones.
2. Develop and conduct a behavioural assay to determine the behavioural response to tested candidates.



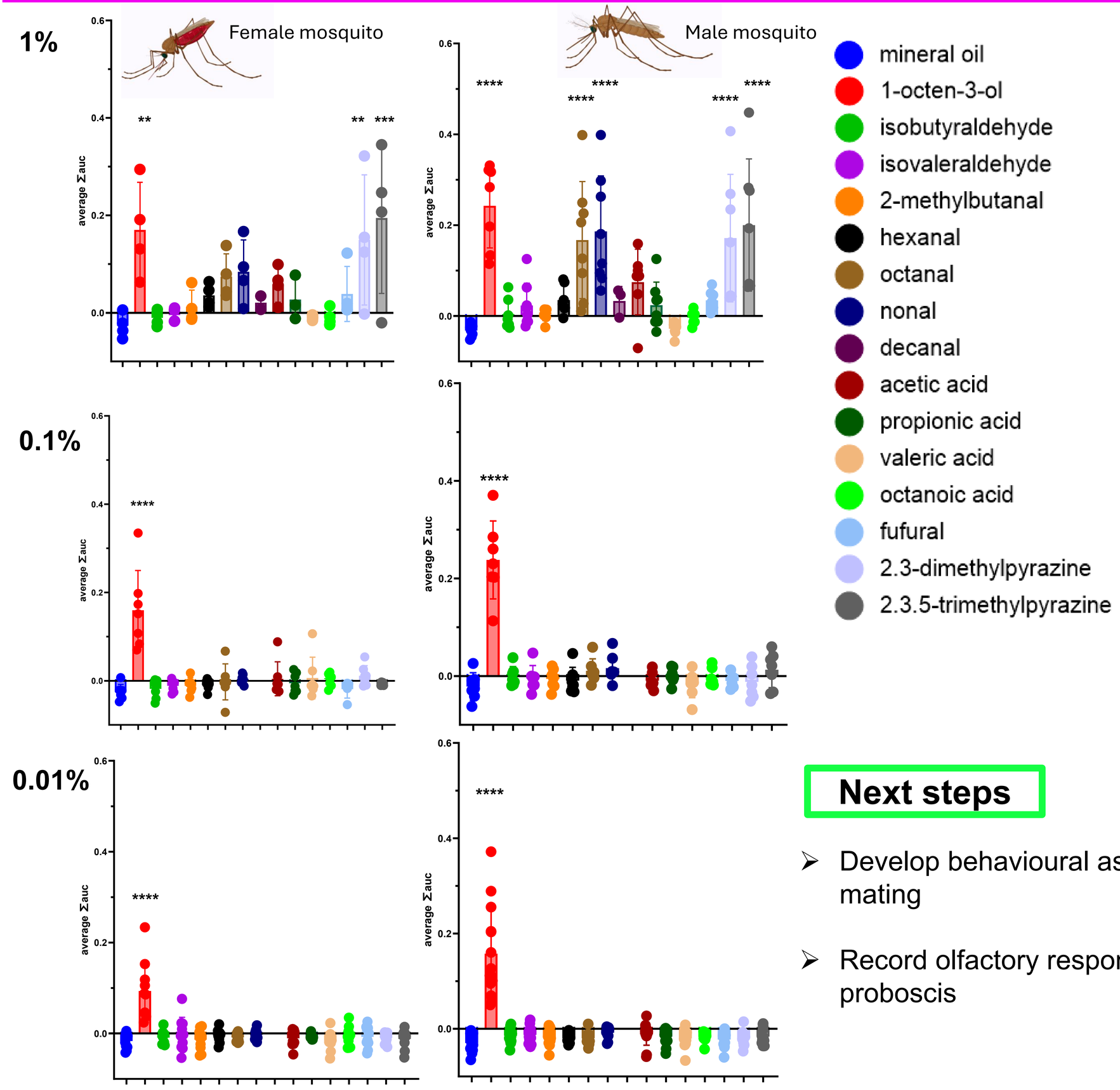
1. Neuronal imaging of antennae of *Anopheles gambiae*



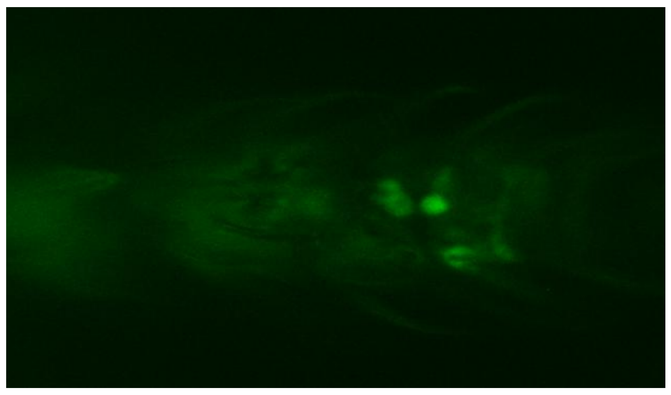


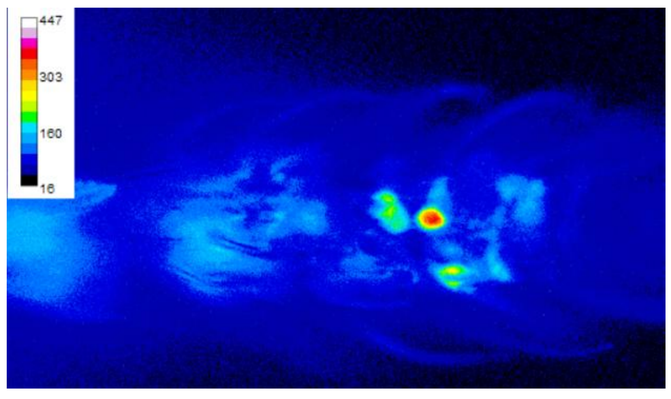
(**left**) Schematic of the calcium imaging setup. Olfactory appendages are imaged with a wide-field microscope. Control/mineral oil was imaged at 0-30 seconds, stimulus – at 30-35 seconds. .
(**right**) Exemplary traces from calcium imaging recording. ΔF/F values from olfactory receptor cells in response to 1% of candidates pheromones

1a. Antennal response of females and males to pyrazines



Antennal response to positive stimuli





Next steps

- Develop behavioural assay to determine successful mating
- Record olfactory responses from maxillary palps and proboscis