



Death pheromones triggering hygienic behaviour in honey bees (*Apis mellifera*)

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Eusocial insects live in teeming societies with thousands of their kin. In this crowded environment, workers combat disease by removing or burying their dead and diseased nestmates. For honey bees, we found that hygienic brood-removal behavior is triggered by two odors – α -ocimene and oleic acid – which are released from brood upon death. α -ocimene is a co-opted pheromone that normally signals larval food-begging, whereas oleic acid is a conserved necromone across arthropod taxa. Interestingly, the odor blend induces hygienic behavior more consistently than either odor alone in a realistic behavioral assay. We suggest that the volatile α -ocimene flags hygienic workers' attention, while oleic acid is the death cue, triggering removal. Hygienic bees detect and remove brood with these odors faster than non-hygienic bees, and both molecules are ligands for hygienic behavior-associated odorant binding proteins (OBP16 and OBP18). Remarkably, the OBPs' relative binding affinities to these ligands accurately reflect the odorants' propensity to induce hygienic behaviour. With this data, we are beginning to unravel the mechanistic basis of this complex, disease-resistance behaviour.