

Learning and discrimination of cuticular hydrocarbons in ants

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Eligible for student prize

Complex social insect colonies require complex communication strategies. Most notably, the ability to identify friends from foes and discriminate individual roles within the colony are central to their social organisation. Cuticular hydrocarbons (CHCs) are known to be key compounds in nest-mate, caste and species recognition in social insects. Despite our growing knowledge of the nature of these cues, we have very little insight into how social insects actually perceive and discriminate among these chemicals. In this study, we used differential olfactory conditioning with custom-designed synthetic hydrocarbons commonly found on CHC profiles to analyse compound discrimination and learning in the Argentine ant, *Linepithema humile*. Our data show that tri-methyl alkanes are more easily learned than single-methyl or straight-chain alkanes. In addition, we reveal that Argentine ants can discriminate between hydrocarbons with different branching patterns, but that backbone chain length alone is not always a discrimination factor. These results demonstrate that the molecular structure of CHCs influence those compounds that ants can discriminate between and learn better, which are thus likely to play a prominent role in chemical signalling and nest-mate recognition.

