Functional genetic study of chemical recognition systems in Argentine ants

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Social insects must be able to identify and differentiate between social group members and non-members in order to effectively communicate and organize tasks within a colony. This recognition system, i.e., colony identity, embodies the first line of defense for insect societies, and is one of many adaptive strategies that have allowed social insects to become ecologically widespread. In ants, species and colony identity is largely based on chemical cues found in cuticular hydrocarbon (CHC) profiles, and perception of these cues is mediated by a range of factors including odorant co/receptors (*Orco* and *Ors*), chemosensory proteins (*CSPs*), olfactory binding proteins (*OBPs*), and Odorant receptor neurons (*ORNs*). To date, functional genetic studies of CHC components have been limited to Drosophila fruit flies. Nonetheless, several important genes involved in CHC biosynthesis have been identified, e.g., desaturases (*desat*), elongases (*elo*), and fatty acid synthases (*mFAS*). A powerful tool for studying the genetic bases of many insect phenotypes has been the use of RNA interference (RNAi), which also holds great promise for studies of recognition systems in ants. For many insects, however, the efficiency of RNAi can be highly variable and presents numerous challenges when attempting to optimize dsRNA-mediated gene silencing. Disentangling the factors affecting RNAi efficiency often becomes a necessary first step for any functional genetic study in a non-model system. In this talk, I discuss findings about elements affecting RNAi effectiveness in ants, and present results of the first functional genetic study of chemical recognition in the invasive Argentine ant (*Linepithema humile*).