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Signals and signatures: pheromones and identity, convergence in mammals and social insects

Mammals and social insects live in worlds dominated by chemical signals and cues. Two mice meeting and sniffing each other are very similar to two ants running their antennae over each other: in each case they share information. Within the complex chemical profiles of the mice and ants there are pheromones and also the identity cues of family or colony. Pheromones are evolved signal molecules that are common across, for example, all queens in an ant species, worn like a crown. In mice, there are pheromones such as darcin, characteristic of dominant males.

The identity cues allow animals to distinguish each other, as colony member or not, for example. Out of the chemical profile, animals learn a subset of molecules, a signature mixture, as the colony odour or the remembered smell identity of a sibling. The representation in the brain of the animal is the template. What is remarkable to me is that across the animal kingdom, these identity cues are always learnt (with the rare exception of green beards). The theme of my talk will be the convergence of mechanisms across the animal kingdom.