Evolutionary studies of honeybee and few insect olfactory receptors

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Living organisms need to scan their environment and detect food, mate, host, threats etc. The chemosensory system enables them to identify different chemicals associated with these sources. There are different types of chemosensory receptors in vertebrates and insects; olfactory receptors (ORs) are involved in recognising mostly volatiles. Different organisms have variable set of ORs, depending on the species-specific requirements. These numbers vary - for instance, mammals possess 1000s of ORs and insects in 100s. Insect ORs are thought to have evolved independently from vertebrate ORs and they exhibit large differences. In this talk, I will describe computational genomics approaches to identify ORs from newly assembled insect genomes. In collaboration with Dr. Axel Brockmann’s lab, differential expression analysis of transcriptome data across workers (females - perform various tasks) and drones (males – mainly involved in mating with the queen) was performed. Enrichment of putative queen mandibular pheromone receptors in drones, putative floral scent receptors and an orphan bee-expanded clade of ORs were observed. In depth information about insect OR diversity and specific details about the ORs from insect order Hymenoptera and particularly bees is provided. Higher OR numbers were observed in Hymenopteran insects irrespective of their degree of eusociality.