respiratory cycle. In addition, we postulate that positive MPSOs are a mixture of excitatory and inhibitory synaptic inputs while negative MPSOs mainly have an inhibitory source.

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Poster session II Poster #186

A phylogenetic analysis of vomeronasal receptors, V2Rs, in rodent species

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Two different neuronal populations exist in the basal VNO of mouse and rat. One population expresses phylogenetically ancient V2R families that are found in other animal species, including terrestrial and marine vertebrates. The other population expresses multiple combinations of V2R subfamilies and class Ib MHC molecules that were more recently established in an as yet unknown murine ancestor (Silvotti et al., 2011, PLoS ONE, 6, e24462). This complex organisation of the vomeronasal organ that exclusively developed in some rodent species could provide a molecular rationale for their exquisite chemosensory ability in individual recognition and mate choice, a prominent feature of these species.

In this work, we have carried out a phylogenetic analysis of vomeronasal receptors, V2Rs, using molecular and bioinformatics tools, in order to identify the position in the phylogenetic tree of rodents (Rodentia order) at which V2R expansion has occurred with the resulting establishment of a new population of vomeronasal neurons. We have also analysed if V2R expansion is associated with the appearance, in the rodent genome, of class Ib MHC genes and genes encoding specific protein pheromones.

Poster session II Poster #20

Left-right asymmetry of olfaction in *Apoidea species*

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We investigated the olfactory learning and responses of the right and the left antenna in three species of Hymenoptera Apoidea: eusocial honeybees (*Apis mellifera* L.), mason bees (*Osmia cornuta* L.), a solitary species, and bumble bees (*Bombus terrestris* L.), an annual eusocial species. By training bees on the proboscis extension reflex paradigm (PER) with only one antenna in use, we found asymmetrical performance favouring the right antenna in responding to learned odours in honeybees and bumble bees, but not in mason bees. Honeybees appear to be lateralized at the population level (more than 50% of the individuals showing a similar direction of bias) in both behavioural (conditioning of the PER) and physiological (ElectroAntennoGraphy, EAG) responses (with a dominance of right-sides structures), whereas, mason bees appear to be lateralized only at the individual level. In the honeybees, lateralization for short-term memory recall of PER seems to be correlated with a difference in the number of olfactory sensilla, which is significantly higher on the right than on the left antenna. In bumble bees electroantennographic responses did not reveal, however, significant antennal asymmetries in odour detection, whereas morphological counting of olfactory sensilla showed a predominance in only one type of receptors, with a higher number of olfactory sensilla trichodea type A in the right antenna. The occurrence of a population level asymmetry in olfactory learning of bees provides new information on the relationship between social behaviour and the evolution of population-level asymmetries in animals. Overall, results seem to support the hypothesis that brain and behavioural lateralization at the population level have evolved under social selective pressures as a strategy to optimize coordination among asymmetrical individuals.