

POSTER PRESENTATION

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# A candidate subspecies discrimination system involving a vomeronasal receptor gene with different alleles fixed in *M. m. domesticus* and *M. m. musculus*

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Assortative mating, a potentially efficient prezygotic reproductive barrier, can prevent loss of genetic potential by avoiding the production of unfit hybrids (i.e. because of hybrid infertility or hybrid breakdown) that occur at regions of secondary contact between incipient species. In the mouse hybrid zone, where two subspecies of *Mus musculus* (*M. m. domesticus* and *M. m. musculus*) meet and exchange genes to a limited extent, assortative mating requires a means of subspecies recognition. We based our work on the following hypothesis: if there is a pheromone sufficiently diverged between *M. m. domesticus* and *M. m. musculus* to mediate subspecies recognition then that process must also require a specific receptor(s) that is also sufficiently diverged between the subspecies, to receive the signal and elicit an assortative mating response.

We studied the mouse *VIR* genes, which encode a large family of receptors in the vomeronasal organ (VNO), by screening Perlegen SNP data and identified one gene, *Vmn1r67*, with 24 fixed SNP differences, most of which (15/24) are nonsynonymous nucleotide substitutions between *M. m. domesticus* and *M. m. musculus*. We observed substantial linkage disequilibrium (LD) between *Vmn1r67* and *Abpa27* (a mouse salivary androgen-binding protein gene that encodes a proteinaceous pheromone (ABP), capable of mediating assortative mating, perhaps in conjunction with its bound small lipophilic ligand). The LD we observed is likely a case of association rather than residual physical linkage from a very recent selective sweep, because an intervening gene, *Vmn1r71*, shows significant intra(sub)specific

polymorphism but no inter(sub)specific divergence in its nucleotide sequence.

We discuss these observations further in the poster and suggest that *Abpa27* and *Vmn1r67* are co-evolving as signal and receptor, respectively, and might act to reinforce subspecies hybridization barriers represented by reduced introgression in the European mouse hybrid zone.

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