
Understand the male effect to an ethical breeding of small ungulates

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Abstract

Small ungulates (sheep and goat) display seasonal breeding characterized by successive periods of sexual activity and sexual rest. During sexual activity, the female ovarian cycle is active (oestrus) and ready for reproduction, whereas females are in deep anoestrus during the sexual rest period. In order to synchronize anovulatory females at the end of sexual rest, breeders are mostly using exogenous hormones. An alternative to these hormones is to expose females to a sexually active male or its fleece/goatee. Indeed, it is well known that fleece/goatee odors can reactivate the female gonadotropic axis, leading in most cases to ovulation. This is called the male effect. Ram and goat odors act as primer pheromones, even if their molecular components are not precisely identified.

Numerous studies have focused on the physiological effects of male odors perception in the female brain, but never at the peripheral level of odors reception. Our previous work on pig has shown that the olfactory secretome, mainly composed of Odorant-Binding Protein (OBP) isoforms is modified under control of endogenous hormones (Nagnan-Le Meillour *et al.*, 2014). We wondered if the olfactory secretome could also be modified by exogenous factors, such as male odors, hypothetically showing an adaptation and a specialization of the peripheral sensory equipment of the females. As there is a strong inter-individual variation in chemical signals and olfactory proteins patterns in mammals, we followed the same flocks of ewes and goats along their cycles during 3 years and during a male effect protocol, we collected their nasal mucus by using a non-invasive manner. The olfactory secretome was analysed by 2D-electrophoresis, and the proteins were identified by high-resolution mass-spectrometry. Our results suggest that the olfactory secretome is a marker of a particular physiological status, and constitutes a phenotype of female receptivity, which can be used by breeders.

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