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Opinion

Importance of the Olphactory Environment in the Laboratory Animal Science

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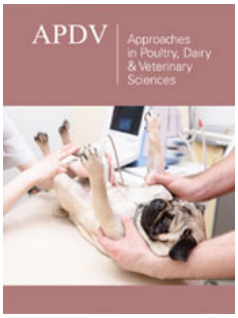

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Opinion

The 3rd R, the refinement is receiving more and more attention. The optimazing of the auditory and olphactory environment of the laboratory animals is essential, because the environmental smells influence the behaviour and occasionally the epigenetics of mammals. According to the characteristics of the smell substances a chemical map is developed in the olphactory bulb. The vomeronasale organ (VNO) has an important role in the pheromone-transfered communication [1]. The VNO is expressing specific major histocompatibility genes, too. In horses and felidae a specific behaviour form, the Flehmen-reaction facilitates pheromone molecules to get the VNO. The intraspecific communication is attained by means of the pheromones, especially in the social and sexual relations. The kairomones are functioning in the communication between species. The interomones are smell compounds influencing the behaviour or physiology of other species, with or without a positive or negative effect for the releaser. Some interomes may decrese the stress of other species [2], having a significance of animal welfare.

The HEPA-filter of rodents' cages does not isolate smells. In rat experiment the smell substance of the fox faeces (2,4,5-trimethyl-tiol=TMT) caused an expressed freezing reaction. The TMT increased the blood ACTH and corticosteron level in rats. In the behaviour of mice, the concentrated, synthethic TMT had only a repellent effect, nevertheless the TMT in fox faeces proved as a real predator stimulus [3]. The irritative smells like tholuol induced fear or aversive behaviour [4]. The epigenetic factors are regulated independently from the base sequence of the DNA and by means of the germ lines, the environment-induced phenotypic changes can be inherited. Based on the inherited fear against the smells, ethological animal models can be outlined and environmentally safe dog-cat relaxant, as well as rodent repellent can be developed [5].

In the present experiment the effects of neutral and irritative smells and the synthetic trimethyl-tiol (TMT) upon the open-field (OF) behaviour of rats, with the background patho-physiology and histology were studied. Twelve ChR (W1) weaned male rats were investigated in five OF test: in the presence of a perfume, 10% and 100% TMT, citronella oil and methyl-hydroxy-analogue (MHA). Hiding during the exposure of diluted TMT lasted longer, than in case of the concentrated TMT and MHA. If no hiding box present, rats spent more time far from the concentrated TMT- source, than from the MHA or perfume. The passive ethological elements were overwhelming under the influence of concentrated TMT and MHA. The grooming was generally rare. Summerizing, the diluted synthetic TMT partly brings about the effect of fox faeces, while the concentrated TMT is a repellent. The citronella represents a light stressor. Freezing has been detected rarely and the final corticosteron values did not differ from the physiological ones and both necropsy and histopatology revealed no pathological alterations. Taken together, the short-term smell effects are not able to develop chronic stress. Our results are close to the findings of Grau et al. [6] who have found an avoidance of mice from the ethanol (neutral chemical substance) as well as from the fox faeces and concentrated TMT. Further studies required to elucitate the long-term effects of smells and to differentiate between irritative and species-related effects of smells.

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