Enhancing animal welfare by olfactory enrichment: the positive impact of soiled bedding on barbering behavior and variability

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Standard housing conditions of experimental mice in biomedical research, are often poorly aligned with the physiological needs of the animals. Consequently, animals may experience stress leading to the development of different types of behavioral abnormalities. Abnormal repetetive behaviors (ARBs) are often observed in laboratory rodents. ARBs include i.) stereotypies, defined as invariantly and inappropriately repeated set of movements ii.) impulsive/compulsive behaviors, such as barbering. Mice produce olfactory signatures, known as pheromones, which are used to communicate social information. Allogrooming and urination result in pheromones being deposited in the nest sight and bedding material. However, in conventional mouse husbandry routines that specifically aim for a “clean environment”, soiled bedding is regularly discarded and replaced. Soiled bedding sentinels have long been an integral part of laboratory animal husbandries, in order to detect infections in a distinct group in experimental animals. The aim of this study was to assess stress levels in litter sentinel mice using corticosterone metabolites in faeces, neutrophil/lymphocyte ratios and behavioural/health monitoring. Our data shows, that providing female mice with soiled bedding, reduces barbering in mice. This could help pave the way for new olfactory enrichment methods, and therefore serve the refinement in laboratory mice.