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Analysing Body Odour of Great Apes Using GC-MS

Great apes are regarded as highly visual animals. However, their olfactory abilities have been almost neglected. Recent studies on olfaction in great apes indicate that the olfactory sense might be more important than previously assumed. A powerful tool for assessing the information content of olfactory signals is the chemical analysis of body odours using gas chromatography-mass spectrometry (GC-MS). This method has been successfully used in several mammals including some primates to show that body odours can contain information on individual identity, group membership, health state or genetic relatedness within a social group. The typical sampling protocols for body odour used in these studies cannot be applied to great apes though, because they cannot be handled unless they are narcotized. Furthermore, great apes do not possess scent glands from which secretions can be collected relatively easily. Accordingly, GC-MS studies in great apes and thus information on the chemical composition of their body odours are still lacking. Here, we present a GC-MS procedure optimized for the analyses of great ape samples based on non-invasive body odour collection in zoo-housed great apes. The procedure was evaluated to reduce the influence of contaminations of the surroundings and sampling material in order to optimize the identification of endogenous (i.e. deriving from the apes) odour components. We present the application of this methodology to biological questions related to species- and individual recognition as well as the assessment of female reproductive states using both quantitative and qualitative analyses of great ape body odours.