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statistically significant differences ($p < 0.001$) between samples collected from the three habitats studied, supporting our initial hypothesis. Mean cortisol metabolite values were about three times higher in animals kept in total captivity ($1,429 \pm 67$ ng/g), and also higher in semi captivity (687 ± 13 ng/g), as compared to results from animals in the wild (444 ± 29 ng/g). We also found statistically significant differences ($p < 0.001$) between females ($1,022 \pm 37$ ng/g) and males (523 ± 17 ng/g) indicating that females had approximately two times higher cortisol metabolite mean concentrations. We conclude that rhinoceroses kept in total captivity might have higher cortisol levels than animals living under natural conditions.

PS7

Faecal cortisol and progesterone metabolites concentration in four captive white rhinoceros (*Ceratotherium simum*) kept in different housing conditions

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Captive breeding is an important safeguard for the white rhinoceroses (*Ceratotherium simum*), as free ranging populations are increasingly threatened by poaching. However, white rhinoceroses are not breeding well in captivity and many efforts focus on improving captive breeding to increase knowledge about reproductive requirements. Cortisol is frequently used as an indicator of stress, and progesterone is a reliable indicator for monitoring reproductive cycles. The aim of this study was to investigate faecal hormone concentrations of captive white rhinoceroses and to correlate results to housing conditions. We studied four rhinoceroses; three individuals (two females and one male) shared an enclosure, whereas one male displaying a strong stereotypy was housed alone. Behavioural observations suggested a dominant-subordinate relationship between the two females. Faecal samples were collected at 10:00 every

day over a year and frozen (-20°C) until analysis. Faecal cortisol and progesterone metabolites were measured by a 5α -pregnane- $3\beta,11\beta,21$ -triol-20-one and a 5β -pregnane- 3α -ol-20-one enzyme immunoassay, respectively. The technique was validated by HPLC analysis. Statistical analysis identified significant differences ($p < 0.001$) in mean cortisol metabolite concentrations between the two males, being higher in the male living with the two females. Although there were no differences on mean cortisol metabolite concentration between both females, statistically significant differences ($p < 0.001$) were found on mean progesterone metabolite concentrations between both females, because the dominant female had oestrus cycles of 29.9 ± 2.13 days in length, whereas the subordinate female was not normally cycling. Results in the two females studied suggested that social status is possibly related to ovarian activity. We found that intra-specific relations between males and females elevated faecal cortisol metabolite concentrations, while hormone concentrations in the single housed male displaying stereotypy were lower. Results of our preliminary study in four animals need to be confirmed in a larger number of animals and under varying social housing conditions.

PS8

Human activity is not the main source of stress in wolves

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Human disturbance has been proven to be a source of stress for several mammalian species and prolonged stress may adversely affect their fitness. The aim of our study was to test if human activity causes chronic stress in wolves (*Canis lupus*). Glucocorticoids in scats have been used as physiological indicators of stress in a variety of species. We therefore assessed the stress level of wolves from six packs (from south-eastern and central Poland) by measuring the concentration of glucocorticoid metabolites in 59 fresh faecal