Do stress and reproductive hormones influence on mares fertility? Hormone determination in hair and pregnancy monitoring

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Introduction and objectives

The consequences of stress and high cortisol levels on equine brood mares can inhibit ovarian production of estrogen , which is necessary for estrous behaviour, growth of follicles and oocyte maturation. The aim of this study is to validate a protocol and the use of an enzyme immunoassay (EIA) test to measure cortisol and progesterone concentrations in hair from brood mares and to evaluate the influence of both hormones on the gestation period and determine their possible use as predictors of fertility and stress.

Material and methods

Sixteen brood mares with ages (3 to 24 years old) and similar life conditions (handling, diet) were used in this study. Hair samples were taken near the moment of artificial insemination or mating and monthly or bimonthly when pregnancy was confirmed by ultrasound diagnosis. A methanol-based extraction protocol developed by Davenport *et al*. (2006) and modified by Tallo-Parra *et al*. (2013) was followed.

Results

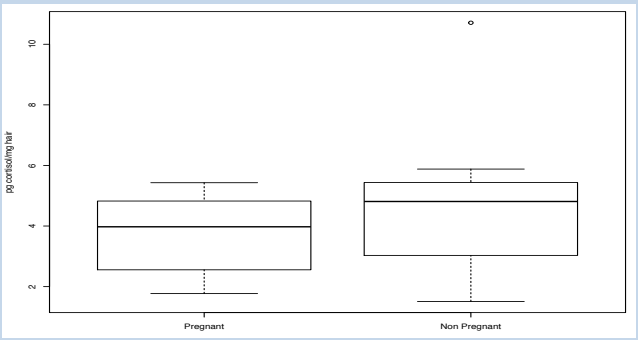

Figure 1. Comparison of hair cortisol concentrations obtained from samples near the IA or mating day between brood mares that got pregnant and did not . P value >0.05.

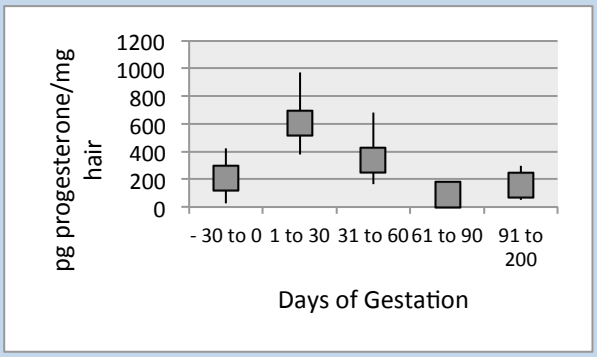

Figure 2. Maximum, minimum and average values of hair progesterone concentrations of pregnant brood mares during the gestation period. P value >0.05.

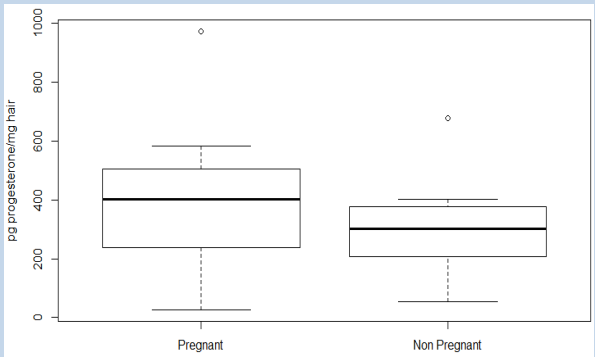

Figure 3. Comparison of hair progesterone concentrations obtained from hair samples collected near the IA or mating day between brood mares that got pregnant and did not. P value >0.05.

Conclusions

Although more research is required in order to study the effect of long-term stress on brood mares fertility, the present study analysed and validated for the first time the detection of cortisol and progesterone in hair form brood mares, providing a new and promising tool for long-term endocrinology research in horses.

References

Tallo-Parra O, Carbajal A, Sabes-Alsina M, Almagro V, Fernandez-Bellon H, Enseñat C, Quevedo MA, Manteca X, Abaigar T and Lopez-Bejar M 2013. Preliminary results on hair cortisol detection as a tool to evaluate chronic stress in *Sahrawi dorcas gazelle* (*Gazella dorcas neglecta*). 9th International Conference on Behaviour, Physiology and Generics of Wildlife, 18 to 21 September 2013, Berlin, Germany, 193pp.

Davenport MD, Tiefenbacher S, Lutz CK, Novak MA and Meyer JS 2006. Analysis of endogenous cortisol concentrations in the hair of rhesus macaques. General and Comparative Endocrinology 147, 255-261.