Bioactivity of 5α-dihydroprogesterone in mares: endometrial response and maintenance of early pregnancy

E.L. Scholtza, B.A. Balla, S.D. Stanleyb, B.C. Moellerb, A.J. Conleyb

aDepartment of Population Health and Reproduction
bK.L. Maddy Equine Analytical Chemistry Laboratory, California Animal Health and Food Safety Laboratory, School of Veterinary Medicine, University of California, Davis, CA, USA

Objective: To investigate the progestagenic bioactivity of 5α-dihydroprogesterone (5α-DHP) on the endometrium and its ability to maintain early pregnancy in mares.

Materials and methods: In Exp. 1, ovariectomized mares (n=4) were treated daily with 5α-DHP (300 mg, im) or vehicle for ten days in a crossover design. Endometrial biopsies were taken immediately before the first administration of 5α-DHP and 24 hours after the last for routine histology and detection of the progesterone-responsive protein, lipocalin (P19). In Exp. 2, mares with confirmed Day 12 pregnancies (Day 0 = ovulation) were treated daily with 5α-DHP (0.7 mg/kg, im) (n=9) or vehicle (n=5), beginning on Day 13. On Day 14, mares were given PGF2α (10 mg Lutalyse® im; Pfizer Animal Health, New York, NY, USA) to eliminate endogenous progesterone. Plasma concentrations of progesterone and 5α-DHP were measured daily by liquid chromatography-mass spectrometry (LC-MS).

Results: In Exp. 1, 5α-DHP stimulated a progestagenic response in the endometrium characterized by increased glandular activity and by the presence of P19 which was not detected in vehicle-treated control mares. In Exp.2, conceptus development progressed to Day 27 (study endpoint) in seven of nine mares treated with 5α-DHP but in none of five control mares (P<0.05, Fisher’s Exact test). Circulating concentrations of 5α-DHP maintained by exogenous administration were similar to the physiologic range of progesterone in cycling or early pregnant mares.

Conclusions: 5α-dihydroprogesterone is a bioactive progestagen capable of activating the endometrium, eliciting progesterone-responsive uterine secretion and maintaining early pregnancy in mares.

Acknowledgements

This project was supported by the Center for Equine Health and by the John P. Hughes Endowment. Professor W. R. Allen kindly provided the α-P19 antibody.

Keywords: 5α-dihydroprogesterone, mare, pregnancy maintenance, progestin