

Oral presentation

Open Access

## Matrix metalloproteinases 2 and 9 in equine amniotic fluid and placental tissues during the last trimester and at parturition

Charlotta Oddsdottir\*, Simon C Riley, Rosemary Leask, Abigail L Fowden, Sidney W Ricketts, Christine Aurich and Elaine D Watson

Address: University of Edinburgh, Royal (Dick) School of Veterinary Studies, Easter Bush Veterinary Centre, Midlothian, EH25 9RE, UK

Email: Charlotta Oddsdottir\* - cod@mi.is

\* Corresponding author

from Perinatal Death In Domestic Animals: The 20th Symposium of the Nordic Committee for Veterinary Scientific Cooperation (NKVet) Reykjavik, Iceland. 26–27 April 2007

Published: 12 December 2007

Acta Veterinaria Scandinavica 2007, 49(Suppl 1):S11 doi:10.1186/1751-0147-49-S1-S11

This abstract is available from: <http://www.actavetscand.com/content/49/S1/S11>

© 2007 Oddsdottir et al; licensee BioMed Central Ltd.

The process of parturition involves a sequence of events that require extensive tissue remodelling. These events include foetal membrane rupture, placental detachment and post-partum involution of the uterus. Normally, foaling in the mare is a quick and dynamic process. Precisely orchestrated tissue remodelling mechanisms are required to control these fast events, hereunder the rupture of the foetal membranes and detachment of the placenta. In tissue remodelling, the matrix metalloproteinases (MMPs) are a much-studied family of enzymes that are involved in extracellular matrix (ECM) degradation. In the mare, invasive chorionic girdle cells have been found to produce MMP-2 and MMP-9, a likely event in the establishment of endometrial cup tissue [1]. The levels of MMP-9 in human and rodent foetal membranes and fluids increased markedly with the onset of labour, relating this enzyme with the rupture of foetal membranes and detachment from the uterus [2]. It is not known whether MMP activity is increased in late gestation or at parturition in mares. The aim of this study was to illustrate the secretion and localisation of MMP-9 and -2 in equine amniotic fluid during late pregnancy and foaling.

A longitudinal study was used to determine the activities of MMP-9 and MMP-2 in equine amniotic fluid through gestation and during foaling in pony mares. The concentrations of MMP-9, MMP-2 and TIMP-2 in amniotic fluid were normally distributed and therefore parametric tests were used: Student's t-test to compare between gestational

ages and outcome of pregnancy (normal birth, stillbirth or abortion), and the activities during the last 3 days before foaling and during foaling.

All zymograms detected MMP-9 and MMP-2, and no significant changes were detected in mid gestation. Approaching normal foaling MMP-9 was present in increasing amounts. Activity of MMP-2 was detected in varying amounts in all samples, but there was no significant change in values through the sampling period. In the days before stillbirth and abortion there was no significant difference in activities of MMP-9 or -2.

When values in the last 3 days before normal birth were compared with values during foaling, activities of MMP-9 and MMP-2 were significantly reduced during foaling. Activities of MMP-9 and MMP-2 in the last 3 days before stillbirth or abortion were also significantly higher than during foaling.

This study shows that MMP-9 production is induced under specific conditions around normal parturition, and that MMP-2 seems to be constitutively expressed at an unchanging level throughout the last days of gestation. Also, MMP-9 activity is highest in the last three days before foaling and is significantly reduced during foaling.

## References

1. Vagnoni KE, Ginther OJ, Lunn DP: **Metalloproteinase activity has a role in equine chorionic girdle cell invasion.** *Biol Reprod* 1995, **53**:800-805.
2. Locksmith G, Clark P, Duff P, Saade G, Schultz G: **Amniotic fluid concentrations of matrix metalloproteinase 9 and tissue inhibitor of metalloproteinase 1 during pregnancy and labor.** *Am J Obstet Gynecol* 2001, **184**:159-164.

Publish with **BioMed Central** and every scientist can read your work free of charge

*"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."*

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:  
[http://www.biomedcentral.com/info/publishing\\_adv.asp](http://www.biomedcentral.com/info/publishing_adv.asp)

