



Royal Veterinary College
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Genotypes associated with equine placental development and pregnancy failure

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Early pregnancy loss (EPL) affects 6-10% of equine pregnancies, with a cause for EPL found in less than 25% of cases. With the exception of a small number of individual cases of recurrent EPL that have been attributed to autosomal chromosomal translocations, we know very little about how genetics contribute to EPL in the horse. Copy number variations (CNV) and Single Nucleotide Polymorphisms (SNP) are microscopic chromosomal changes common to vertebrate genomes. Human placenta has an enrichment of somatic CNVs in regions containing genes involved in normal placental development and function, and changes in CNV frequency are noted in pregnancy failure. In preliminary studies, we identified a number of CNV regions in the genome of early failed placentae. This studentship aims to identify genotypes associated with EPL in Thoroughbred horses. We will be profiling copy number variations (CNVs) in equine placental genomes throughout placental maturation. We will also compare the placental genome in healthy early and failed pregnancies and determine the inheritance of the CNV regions through CNV analysis of the maternal and paternal genome. Third, we will identify SNPs in the placental genome associated with EPL using genome-wide association analysis.

The project will be supervised by a panel that combines expertise in equine and comparative reproductive biology and pregnancy, together with molecular and cell biology and genetics. The student will receive excellent training in a range of molecular techniques at the RVC and through a placement in the USA and will have opportunities to present work at national and international conferences. The combined results from this work may lead to the development of a genetic test for use as a diagnostic tool to determine the cause(s) of EPL in mares and allow better mating selections.

References:

- Rose BV, Firth M, Morris B, Wathes DC, Verheyen KLP, de Mestre AM. Descriptive study of current therapeutic practices, clinical reproductive findings and incidence of pregnancy loss in intensively managed thoroughbred mares. *Animal Reproduction Science*. 2017 in press
- Rose BV, Cabrera-Sharp V, Firth MJ, Barrelet FE, Bate S, Cameron IJ, Crabtree JR, Crowhurst J, McGladdery AJ, Neal H, Pynn J, Pynn OD, Smith C, Wise Z, Verheyen KL, Wathes DC, de Mestre AM. A method for isolating and culturing placental cells from failed early equine pregnancies. **Placenta**. 2016 Feb;38:107-11.

- Ghosh S, Qu Z, Das PJ, Fang E, Juras R, Cothran EG, McDonell S, Kenney DG, Lear TL, Adelson DL, Chowdhary BP, Raudsepp T. Copy number variation in the horse genome. **PLoS Genetics**, 2014. 10(10):e1004712

This is a three year fully funded studentship supported by the Thoroughbred Breeders Association and the RVC.

It is open to [Home/EU applicants](#) only. International students are welcome to apply but must be able to pay the difference between UK/EU and international tuition fees.

The studentship will commence in October 2018.

How to apply For more information on the application process and English Language requirements see [How to Apply](#). **Applications should be made via [UKPASS](#) by Sunday 24th June.**

Interviews - will be held shortly after at either [the Camden or Hawkshead Campus](#)

We welcome informal enquiries - these should be directed to Dr Mandi de Mestre on ademestre@rvc.ac.uk