

## **Travel Report to the New Zealand Equine Research Foundation**

Margaret J Evans, 14 October, 2012

### **Report for the NZERF Board.**

I am grateful to the NZERF for their generous support of my travel to attend the International Symposium on Equine Reproduction (ISER) Committee meeting, and the 14<sup>th</sup> International Congress on Animal Reproduction (ICAR), in Vancouver in late July-early August.

The committee for ISER meets every 2 years: once at the Symposium itself and 2 years later at the time of the ICAR meeting. Although this was my last meeting after 16 years on the Committee, I felt it was important to attend as New Zealand will be hosting the 2014 ISER Symposium in Hamilton, organised by a Local Committee led by Dr Lee Morris as Chairperson, and a committee of New Zealanders and Australians, of which I am one. This meeting in Vancouver decided on the format of the next Symposium, including the numbers of presentations, convenors (reviewers), invited speaker, honorary Chairperson, and how the papers will be published and election of editor, and timeline for the submission and review process. Dr Morris, who is a member of the ISER committee, presented a very full report on the local organising committee's plans to date, plus an updated budget which was well received. I was the only out-going ISER committee member to be able to attend the meeting but I believe it was well worthwhile; since meetings are only held every 2 years it takes a long while to accumulate knowledge and I felt I was able to make a worthwhile contribution.

The ICAR was held in the very attractive Vancouver Convention Centre right on the shore with the cruise ships along-side. The Congress was divided into plenary, symposia and poster presentations with workshops on specialized topics. Probably the biggest difference I observed at this, compared to earlier Congresses, was the emphasis on how research in domestic animals has a much wider application than just to the species in which it is performed. In particular, there were a number of symposia papers which directly addressed how domestic animals are appropriate models for human reproduction and medicine, and on several occasions it was emphasised that domestic animals are better models for humans than the traditional laboratory animals (rats and mice). It is quite possible that promoting domestic animals in this way reflects funding opportunities, but looking at it from an equine perspective, it appeared to me that the horse, like other domestic animals, is no longer viewed as a "special case" with respect to its scientific merit, but more as another model with certain advantages with respect to human health. In the longer term I see this as very positive in that some equine research may be able to attract funding from sources other than those confined to the horse.

There was one workshop devoted to equine reproduction, and this was on Conceptus-Uterine Interactions, or "embryo-maternal dialogue". Dr Tom Stout (Utrecht University, The Netherlands) introduced the workshop by reminding us that 60% of all detected pregnancy losses occur between Days 15 and 42 (the overall pregnancy loss is approximately 15%). Dr Stout challenged the speakers to shed light on what goes wrong during this period, and why is the horse embryo so vulnerable. A mare's relationship with the conceptus is remarkably complex in the early stages of pregnancy. In order to prevent early embryonic loss, the conceptus must interrupt the mare's oestrous cycle so she does not come back on heat, and signal to the uterus to create an environment that is suitable for the attachment and growth of the embryo. How the mare knows that the embryo exists (the maternal recognition of pregnancy) has not been established in the horse. The first speaker to address the questions was Dr Claudia Klein from the University of Kentucky who spoke about her work with day 8-14 embryos searching for genes specific for the equine capsule. The mare is unique in that the embryo remains mobile for approximately 9-18 days following fertilization, and a capsule surrounds the embryo almost like an egg shell. Three genes found were related to sialic acid which is a compound that prevents the embryo from sticking to the uterus so it can move around. This movement, thought to be regulated by prostaglandin production from the embryo, is important for the embryo to gain adequate nutrition at this time, and for the embryo to "signal" its presence throughout the uterus. Critically, the embryo must also prevent the production of prostaglandin from the mare to

prevent her coming back on heat. Just as important is the need for the embryo to become “fixed” in one place, the eventual site of placentation when movement suddenly ceases around day 16-18. Addressing the mare’s perspective, Dr Stefan Bauersachs from The Gene Centre, University of Munich, spoke about his research in which they identified 374 genes differentially expressed in the mare’s endometrium (lining of the uterus) on Day 12 after conception compared to those present at day 8. Work is on-going to identify possible genes and biological processes that are important in the response of the endometrium to the embryo. Dr Tony Hayes, University of Guelph, Canada, spoke about changes, particularly in the various proteins, that occur around day 21 when the capsule is disintegrating and the embryo becomes more vulnerable. Dr Doug Antczak, Cornell University, New York, discussed the critical interaction between the foetus and the mare around the time (Days 34-36) when the invasive trophoblast cells of the equine placenta migrate into the endometrium to form the endometrial cups; dense accumulations of trophoblast cells that produce equine chorionic gonadotropin between days 40 and 120 of normal pregnancy. How the trophoblast cells invade the endometrium while evading maternal immune destruction by the mare is not really known. At Cornell they have used gene analysis on placental tissues obtained at day 34 of gestation and discovered a >900-fold increase in the gene expression for the cytokine IL-22 in the tissues involved in establishing the endometrial cups. He proposed that IL-22 cytokine produced by the chorionic girdle binds has a role in foetal-maternal communication by modulating endometrial responses to trophoblast invasion.

The poster sessions were held every morning while no other sessions were running allowing full opportunity for attendees to view them. This meeting was the first I have attended which asked for electronic posters. These were delivered at scheduled times, with authors giving a 3 min summary of their poster which was effectively a mini power-point presentation, with 2-3 min for questions. There were advantages to this format (particularly for the organisers who required far fewer poster boards and much less space compared to that required if all posters had been the traditional paper “poster”) and some disadvantages. As an attendee, I did not find it very easy to hear or see the presentations due to the noise, and number of people trying to view. However, the fact that the posters were always available to view at any time meant that you could read a poster in detail in your own time, regardless of day of scheduled presentation, which is not possible with paper posters. As a presenter, I found the preparation of an electronic poster a little bit of a challenge, but appreciated not having to carry a poster “tube” with me when travelling to the meeting.

One of the benefits of travelling to a conference is the opportunity to meet with other researchers. On this occasion I met with Dr Eduardo Gastal, now at the University of Southern Illinois, USA, who has been a collaborator on a project funded by the NZERF (9/03). We discussed the possibility of measuring progesterone on the samples in which we have previously measured LH and hCG. These samples are held in Endolab, Christchurch Hospital and as Dr Gastal is keen that we assay these samples, I have initiated some validation experiments. Dr Gastal also invited me to visit his laboratory for a month to further exchange ideas. I also spoke with Dr Beatriz Quintero from the University of Venezuela about the possibility of a future collaboration.

Overall I found the trip extremely worthwhile, and again I thank the NZERF Board for their support – it is very much appreciated.

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