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The eleventh International Symposium on Equine Reproduction (ISER) was held in Hamilton, New Zealand from 26 to 31 January 2014. This four-yearly meeting is the primary forum for the presentation of research relating to the practice of, and the science underlying, equine reproductive medicine. At the latest ISER, 151 submitted papers were presented (79 oral, 71 posters) within the 4 sections of the programme, namely: Stallion (27 oral, 26 posters), Non-pregnant mare (24 and 25), Conception and Early Pregnancy (11 and 11), Pregnant Mare and Perinatology (17 and 10). These were supplemented by one invited lecture (The John Hughes Memorial Lecture) delivered by Professor R.J. Aitken on “Aspects of sperm physiology – oxidative stress and the functionality of stallion spermatozoa”, and 6 evening workshops dedicated to highlighting and discussing the scientific background to challenges or recent developments in clinical practice.

During the reproduction news hour at Voorjaarsdagen, the focus will be on a small number of the advances presented at the ISER Symposium that are ready for implementation in the field or considered to be of relevance to clinical practice, now or in the foreseeable future. The aim is to give those with an interest in reproduction that were unable to make the trip to New Zealand an overview of recent breakthroughs and progress in a central part of equine practice. The abstracts of all the original presentations are available as an issue of the Journal of Equine Veterinary Science (2014; volume 34, number 1).
EQUINE EMBRYO TRANSFER: WHAT IS NEW?

Embryo transfer (ET) plays a very important role in the equine breeding industry. Indeed, good pregnancy results are obtained with the non-surgical transcervical transfer, for both the direct transfer of freshly recovered embryos as the transfer of shipped embryos which have been cooled for up to 24h. Usually, the transcervical transfer is performed using a sterile 0.25 or 0.5 ml straw in a “cassou” type transfer pipette [1]. Depending on the operators preference this gun can be rigid (IMV type) or more flexible (Minitube type). Larger embryos, which cannot be loaded into a 0.5 ml straw, can be transferred transcervically using a sterile Al pipette as described by Wilsher and Allen [2]. The present research in equine ET mainly focusses on these areas which have attributed to the huge success of ET in bovine, i.e. superovulation of the donor animal, cryopreservation of the embryos and pre-implantation genetic diagnosis.

Using semen of good fertility, embryo recovery rates of 60% can be achieved in normal fertile mares [3]. Superovulation procedures using equine FSH or equine pituitary extract (EPE) result in an increased number of ovulations. Using EPE an average of 4 to 7 ovulations per mare can be achieved. Unfortunately, the embryo recovery rate remained poor [4]. A recent study however showed that twice daily injection of deslorelin acetate is able to induce a double ovulation in mares resulting in an increased embryo recovery rate from 0.57 embryos per cycle in the control group to 1.12 embryos per cycle in the treatment group [5]. Additionally, the majority of these double ovulations (81%) occurred within 6 hours making it also a valuable protocol for mares bred with frozen semen. So far, the two commercial injectable formulations of deslorelin acetate are not available in Europe. Moreover, European legislation prohibits the use of all superovulation hormones in equine practice.

In contrast with bovine ET, cryopreservation of equine embryos is not routinely performed. Acceptable results (pregnancy rates of ≥ 55%) can be obtained when cryopreserving small embryos, i.e. < 300 µm [6]. Cryopreserving larger embryos usually results in poor pregnancy rates. Therefore, research mainly focusses on obtaining these small embryos which must be flushed very shortly after their arrival in the uterus (day 6 -6.5). The time of entry in the uterus depends on several factors such as time of year, type of semen used and age of the donor mare [1]. This might explain the dramatic decrease in embryo recovery rate when flushing these early stage embryos (144 hours post ovulation). Alternatively, PGE2 gel could be applied directly to the ipsilateral oviduct on day 4 post ovulation. As such, early embryos can be flushed one day later [6]. As this procedure requires laparoscopic surgery, it is impractical from a financial and animal welfare point of view. These early stages are not required when embryos are biopsied and the blastocoele fluid from expanded blastocysts is aspirated prior to cryopreservation [7]. Choi and coworkers managed to obtain a 71% pregnancy rate transferring these biopsied frozen/thawed expanded blastocysts. The high costs for the equipment and the required experience for this procedure renders this technique impractical as well to apply in a large scale commercial setting.

On the other hand, this biopsy technique enables the collection of some embryonic cellular material. The latter could be used for preimplantation genetic diagnosis (PGD). Using a PCR amplification technique, this small number of cells is sufficient to determine the gender of the embryos [8]. Further optimization of this technique would also allow for testing the embryos for known equine genetic disorders and phenotype characteristics. As such, this could result in marketing (frozen) sexed embryos with known genetic potential. However, further research as well as biosecurity measures are mandatory before this can be implemented into equine practice. To date, only non-biopsied frozen embryos (i.e. with an intact zona pellucida) can be transported across nation borders.

It is clear that, although equine ET already has a distinct impact on the equine breeding industry, ET has not reached its full potential yet, resulting in a promising future, both from a practical point of view as well as from a scientific (challenging) perspective.


