



EMBRYO TRANSFER

Patrick M. McCue

DVM, PhD, Diplomate American College of Theriogenologists

Embryo transfer involves the removal of an embryo from the uterus of one mare, and the transfer of that embryo into the uterus of another mare. The first foal produced by embryo transfer was born in 1974. Since that breakthrough event, there has been a tremendous amount of basic and applied research performed which has allowed embryo transfer to become a relatively routine procedure in equine reproduction.

Embryo transfer can be a beneficial assisted reproductive technique in that valuable mares may have more than one foal per year, older mares can donate embryos to young recipients, subfertile mares can donate embryos to reproductively healthy mares and mares in athletic competition can donate embryos and remain in training.

The best embryo donors are mature, reproductively healthy mares. Optimal breeding management of the donor mare and attention to detail prior to and after breeding is essential for embryo collection success. The donor mare should be examined by palpation and ultrasonography daily during estrus to determine the exact day of ovulation.

Embryo recovery is usually attempted 7 or 8 days after ovulation. A sterile catheter is inserted through the cervix and the uterus is filled with embryo flush media. The media

is then allowed to flow back out through the catheter and is passed through an embryo filter. Contents of the filter are poured into a search dish and examined for the presence of an embryo under a microscope. Embryos collected on day 7 or 8 are generally less than 1 mm in diameter. Recovered embryos are washed and maintained in holding media until transferred into a recipient mare.

Factors that influence embryo recovery rate are age and fertility of the donor mare, quality of the semen used, day of recovery, and number of ovulations. Embryo recovery rate may be 50 to 70% per cycle from young reproductively healthy mares and may be only 25 to 40% (or less) from older mares with a history of subfertility.

Management and quality of recipient mares are key components to a successful embryo transfer program. Ideally, recipient mares should be young maiden mares or mares with a recent history of having carried a foal to term. An older maiden mare or a mare with a history of subfertility would not be good choices as a recipient for a valuable embryo.

It is critical that the estrous cycle and day of ovulation of the recipient mare be closely synchronized with that of the donor mare. The recipient may ovulate the day before,

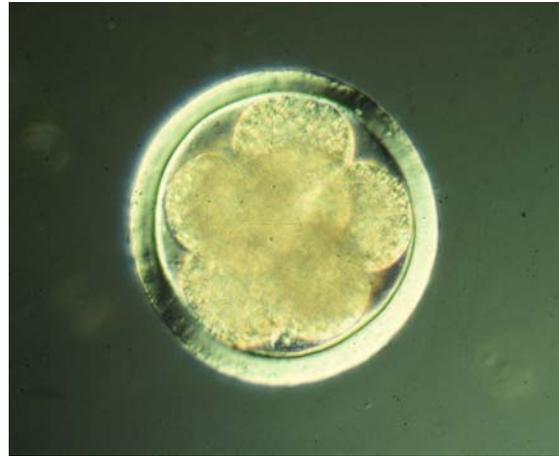
the same day or up to 3 days after the donor mare. Ovulation dates outside of this synchronization window will dramatically reduce transfer success rates.

Estrous synchronization is not an exact science. Consequently, in smaller embryo transfer programs it is common to try to synchronize two or three potential recipients with a given donor mare in order to increase the odds of at least one recipient ovulating in the critical time window. Ideally, we would like the recipient mare to ovulate 1 to 2 days after the donor mare.

A majority of equine embryos are transferred nonsurgically into the uterus of recipient mares. A specialized embryo transfer instrument or a standard insemination pipette may be used to transfer the embryo through the cervix and into the uterus of the recipient mare. It is not unusual for a recipient mare to be administered medications prior to and/or after transfer with the goal of increasing transfer success or helping the mare maintain a transferred embryo.

Since the embryo is already 7 or 8 days old at the time of transfer, owners of the donor mare do not have to wait long to find out if the recipient mare 'accepted' or 'took' the embryo. If the transfer is successful, the embryo can usually be observed on ultrasound examination 5 to 7 days after transfer. Follow-up pregnancy examinations are encouraged as some recipient mares do not stay pregnant to term. A majority of embryo losses occur prior to day 50 of pregnancy and the loss rate is generally highest for embryos recovered from older mares.

Foals born to a surrogate mare are eligible for registration with the American Quarter Horse Association. The AQHA requires notification and enrollment prior to transfer of an embryo (refer to Rule 212). Parentage or pedigree must be verified through genetic (DNA) testing of the foal, sire and donor mare.



Photograph of an 8-cell embryo