



OOCYTE TRANSFER

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A single oocyte or egg is present in every ovarian follicle. In the normal progression of reproductive events that result in an equine pregnancy, an oocyte is released from the follicle at ovulation and is picked up by and transported down the oviduct. If the mare was bred or inseminated, several thousand spermatozoa would be present and waiting within the oviduct. A single spermatozoon may locate, penetrate and fertilize the oocyte. The developing fertilized egg or embryo spends the next 5 to 6 days within the oviduct before entering the uterus.

Consequently, in order for a pregnancy to occur, mares have to develop a large follicle and ovulate, the oocyte must be fertilized within the oviduct and subsequently passed into the uterus, and the uterine environment must be sufficiently healthy to allow for continued embryonic development.

If any of these factors fail or are inadequate, the mare will not become pregnant or will not stay pregnant. The technique of oocyte or egg transfer has been used to bypass issues of ovulation failure or severe oviductal, uterine or cervical pathology. Oocyte transfer may be successful in obtaining foals from mares that cannot carry their own pregnancies or cannot donate an embryo for transfer to a recipient. The technique is most often used in older mares with a history of subfertility or infertility.

Oocyte transfer has also been used to obtain foals from oocytes harvested from the ovaries of mares that have died or been euthanized for various medical conditions.

Traditional oocyte transfer involves collection or harvesting of one or more eggs from the preovulatory follicles of mares in estrus. Follicular development in an oocyte donor mare is closely monitored by ultrasonography. Human chorionic gonadotropin or deslorelin acetate is administered to the donor mare once a large follicle is detected to facilitate maturation of both the follicle and oocyte. The next goal is to collect an oocyte from the follicle within a few hours *prior to* ovulation.

The most common technique used to harvest an oocyte is transvaginal, ultrasound-guided follicular aspiration. The donor mare is sedated and a special ultrasound probe and guide is inserted into the vagina and positioned against the front vaginal wall adjacent to the cervix. A long needle, specifically designed for oocyte collection, is passed down the guide. The needle penetrates the vaginal wall and is passed directly into the ovary containing the preovulatory follicle. The follicular fluid and oocyte are aspirated directly from the follicle and collected into a sterile container. A microscope is used to identify and

evaluate the oocyte, which may be 0.1 to 0.15 mm in diameter.

Oocytes may be transferred immediately into a surrogate or recipient mare, or the oocyte may be cultured in an incubator for 12 to 16 hours prior to transfer. Recipient mares may be either cycling mares synchronized with the donor mare or may be non-cycling mares treated with estrogen and progesterone to mimic a natural cycle. If a cycling recipient is to be used, it is critical to remove the oocyte from her preovulatory follicle to ensure that any pregnancy that develops after transfer is from the donor oocyte.

The donor oocyte is transferred into the oviduct of the recipient mare via a flank surgery approach. The recipient mare is inseminated with spermatozoa from a fertile stallion either before oocyte transfer, directly after transfer or both. The stallion is selected by the owner of the oocyte donor mare and either fresh, cooled-transported or frozen semen may be used.

Fertilization, embryonic development and all of gestation occur within the recipient mare. It is common for the recipient mare to be supplemented with progesterone or a synthetic progestin during the first few months of pregnancy.

In an experienced clinical equine reproduction center, the success rate of oocyte collection from donor mares is 70 to 80%, and pregnancy rates after transfer of oocytes to recipient mares is 40 to 50% or greater. The factors that most strongly influence success of oocyte transfer are age and health status of the donor mare and quality of semen provided for the procedure. As with embryo transfer, parentage must be verified through genetic (DNA) testing of the foal, sire and oocyte donor mare.