IN VITRO FERTILIZATION & EMBRYO TRANSFER: A COMPARISON

Many breeders have elite females from which they can market valuable genetics and offspring. With the use of advanced reproductive technologies, more offspring can be propagated to help multiply the success of breeding and marketing programs. While many breeders are familiar with embryo transfer (ET), an increasing number of breeders are implementing In Vitro Fertilization (IVF) into their reproductive programs.

EMBRYO TRANSFER

Conventional (in vivo) ET involves specific hormonal treatment (with follicle stimulating hormone) of donor females to cause multiple follicles to ovulate. The donors are bred using artificial insemination (AI), or naturally covered by a buck, following super ovulation after estrus (standing heat). Approximately six days after insemination, embryos are surgically collected or "flushed" from the donor's uterus and transferred fresh into synchronous recipients who will serve as surrogate mothers, or frozen to be implanted at a later date.

Embryo transfer is one option that can increase a female's reproductive efficiency, allowing her to have numerous babies per year. ET can increase her reproductive efficiency to numerous offspring per year – allowing breeders to multiply the success of their superior pedigrees.

Embryo transfer is a very accessible technology and produces the option to have embryos transferred fresh into synchronized recipients, or to have the embryos safely frozen to be transferred at a later date.

By creating more offspring that are valuable to a herd, breeders can advance their marketing opportunities, improve their reproductive performance, and enhance the rate of genetic gain.

IN VITRO FERTILIZATION

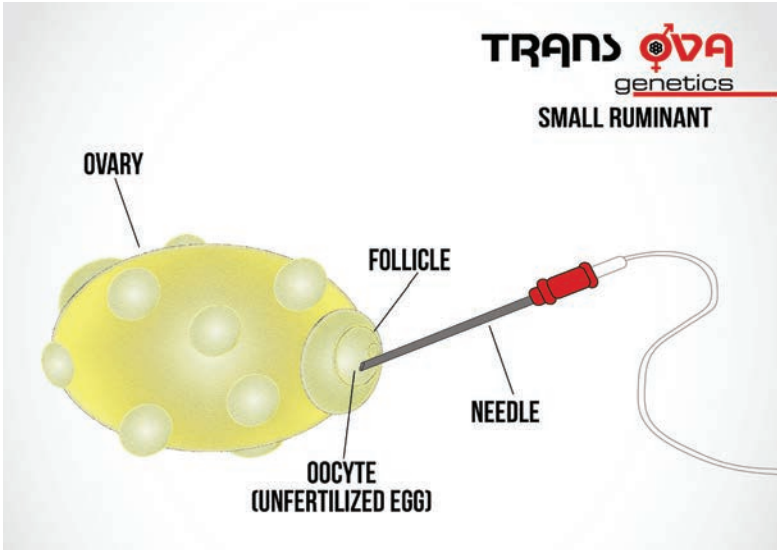
An IVF collection, called an Aspiration or Ovum Pick Up (OPU), is the process of harvesting unfertilized oocytes, (unfertile eggs) directly from the ovaries of a donor doe or ewe. Recovered oocytes are fertilized one day after aspiration and transferred six days after fertilization. During this seven-day time period, they are cultured and grown in an incubator with controlled media, temperature and environment to mirror the female's uterus. They are then transferred into recipients seven days after the recipient's standing heat or estrus, which is similar to the transfer process for embryos produced by embryo transfer.

Oocytes are harvested from the donor female using a procedure called Laparoscopic OPU (Ovum Pick Up), also known as an aspiration. The donor will have laparoscopic perforations, rather than a traditional surgical incision, drastically shortening recovery time and stress on the donor. Additionally, subsequent procedures can be performed within a shorter time frame than conventional flush surgeries, as quickly as three weeks. An added plus to small ruminant IVF is the fact that adhesions are a rare occurrence with Lap OPUs, helping extend the reproductive life of your elite donor females.

Breeders who choose to use IVF technology have the opportunity to obtain more offspring from valuable females in their herd, similar to the benefit of embryo transfer. Many breeders do not realize however, the additional benefits when using IVF.

IVF is a technology that allows breeders to collect offspring from open females, virgin doe kids or ewe lambs, as well as problematic animals that have had difficulty in conventional breeding attempts. It is also possible to retrieve oocytes (unfertilized eggs) from donors shortly after a death event to produce one final genetic collection.

When compared to embryo transfer, IVF may further maximize the potential of an elite female in a shorter time period, as the interval between IVF aspirations is shorter than the interval between traditional embryo transfer sessions. It is possible to obtain IVF cycles every four weeks, whereas most embryo transfer programs will collect donors every 60 days.



A NEEDLE ENTERS A FOLLICLE TO RETRIEVE AN OOCYTE (UNFERTILIZED EGG).
THE OOCYTE IS PULLED INTO THE NEEDLE AND INTO A COLLECTION DISH FOR FERTILIZATION IN THE LAB.

While conventional embryo transfer generally requires the use of two units of semen per donor, IVF can be used to maximize the value of rare, sexed, or expensive semen. One unit of semen can be applied to oocytes from multiple donors, or semen from two or more bucks may be used to fertilize a group of oocytes collected from an elite female.

WHAT'S THE BEST OPTION FOR ME?

Embryo transfer is likely the best choice for prolific embryo producing donors that can meet the owner's embryo production needs. In this scenario, embryo cost is economical and in vivo embryos hold a slight pregnancy rate advantage for both fresh and frozen embryos when compared to IVF.

In many instances, IVF provides more value. It is more cost effective to use IVF on low embryo production donors or females you would like to keep in the production cycle. Additionally, IVF can reduce donor boarding costs and semen costs by utilizing a single straw of semen to fertilize multiple embryos, with the opportunity to use more than one sire on a single donor aspiration.

CONCLUSION

Depending on the specific needs of a breeder's program, various approaches can be taken. It is important for producers to understand how each and every reproductive technology can be used to benefit your operation. While IVF may not be the answer for every donor program, many have realized it is a tool that offers unique opportunities to extend elite genetics provided by both proven donors and rare or expensive sires.

To effectively and economically integrate IVF technology into a breeding program, breeders are encouraged to carefully review their goals, understand the opportunities and limitations of both options, and work with the experienced, professional teams to determine the best advanced reproductive technology programs to meet their goals.

QUESTIONS?

Contact a Trans Ova Genetics client service representative at our Small Ruminant Headquarters in Chillicothe, Missouri • 800.372.3586

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