



STEPS AND ADVANTAGES OF LARGE-HORN CATTLE EMBRYO TRANSFER

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Received: 21 st March 2023	This article covers the need to carry out embryo transpalantation in order to quickly create herds of large-horned cattle of pure breed on the territory of Uzbekistan with high productivity indicators, as well as the stages of transplanting. In our country, the achievements that can be achieved in animal husbandry are presented if embryo transplanting is established.
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INTRODUCTION. The increase in the number of population in our country increases the demand for milk and milk products, meat and meat products. Cattle imported from foreign countries are mainly kept in economically stable livestock farms. It is possible to increase the number of purebred cattle in our country by transferring embryos from existing purebred cattle into the wombs of local cattle and obtaining purebred calves with high productivity from local cattle. Advances in biotechnology have been used in the laboratory of the Animal Husbandry Scientific Research Institute, and embryo transplanted has been carried out. But these works were stopped because the laboratory equipment was outdated and the institute did not have enough funds to update them. Investigations in this direction are expensive. There is a shortage of highly skilled specialists in many new modern genetic studies.

LITERATURE ANALYSIS AND METHODS

Embryo transplanted was first performed and described by Walter Heap in 1890. He transplanted two Angora rabbit embryos into pregnant Belgian rabbits and obtained mixed litters from rabbits of both breeds. Experiments on the transplanted of embryos into large farm animals began in the 1930s in sheep and goats. The first successful embryo transplanted into cattle and pigs was carried out by Jim Rawson in Cambridge (England) in the 1950s. Embryo transplanted in cattle In the late 1970s and 1980s, embryo transplanted was carried out under laboratory conditions using in vivo and in vitro technology.

One of the tasks of embryo transplanted is to select the offspring of the selected parents from among them and then breed higher quality offspring. Thus, embryo transplanted is a systematic biotechnological method of accelerated breeding process to improve the offspring in several generations.

The success of transplanted is largely determined by the correct choice of donor and recipient: the best cows are used as donors, and the worst breeding cows are used as recipients.

It is important to get more female offspring from one cow with the help of transplanted. Obtaining a large number of offspring from parents, distinguished by economically useful characteristics, allows to accelerate the genetic development of families, herds, generations and breeds.

The method of embryo transplanted combined with cryopreservation makes it possible to preserve and multiply embryos from record animals, as well as the gene pool of local, endangered breeds. In the future, the gene pool of endangered species can be used to restore valuable qualities lost in other breeds during intensive breeding. The method of embryo transplanted can also be used to solve the problems of acclimatization of breeds and hybrids to create high-yielding populations in regions with extreme climatic conditions. With this, it is possible to quickly achieve breeding and selection achievements.

The advantages of embryo transplanted are fully manifested only in certain organizational and economic conditions: proper nutrition, proper maintenance of donor cows and recipient cows, planned breeding and selection

work on farms, highly qualified it is necessary to provide gynecologists, technologists, laboratory assistants with tools and equipment, hormonal drugs, tools and reagents.

STAGES OF EMBRYO TRANSPLANTATION

The process of embryo transplantation is divided into 7 stages, each stage is considered important and requires high skills.

1. Selection of donor cows.
2. Induction of superovulation in donor cows.
3. Fertilization of donor cows.
4. Collection of embryos (dilution).
5. Evaluation of the embryo.
6. Selection and training of recipients.
7. Embryo transplantation.

Selection of donor cows. The first step in the implementation of the method of embryo transplantation is the selection of donor cows. Transplantation method is suitable for a limited number of animals, which can be reproduced economically.

Induction of superovulation in donor cows. Superovulation is the release of many eggs from the cow's ovary during one cow. After appropriate hormonal treatment, a cow or heifer can produce up to 10 or more eggs per ewe.

The main principle of superovulation is to stimulate the growth of ovarian follicles with the help of hormonal drugs with follicle-stimulating activity. The drug is administered to the cow twice a day, in the second half of the estrogen cycle, during the functional activity of the corpus luteum of the ovary.

On the third day of follicle-stimulating hormone treatment, a prostaglandin is injected into the cow, which causes resorption of the corpus luteum and the appearance of estrus approximately 48-60 hours after the injection.

Fertilization of donor cows. Because many ovaries are released during superovulation, embryo transfer specialists perform multiple inseminations during donor insemination during estrus. One effective regimen involves inseminating donor cows 12, 24, and 36 hours after ovulation. The use of high-quality, high-percent motile sperm seeds is very important in the process of embryo transplantation.

Wash the embryos. Embryos are collected with the help of a rubber catheter, a special liquid physiological agent is introduced into the uterine cavity, and then sent back together with the embryos.

Embryo flushing is usually done 7-8 days after donor fertilization. The process of collecting this embryo should be done relatively quickly and in 30 minutes without harming the animal.

The liquid is placed in a large measuring cylinder together with the washed embryos. After about 30 minutes, the embryos settle to the bottom of the cylinder and can be placed under a microscope for evaluation after drying the upper layers of liquid.

Evaluation of the embryo.

The following basic criteria are used to evaluate embryos:

- the shape of the embryo;
- compactness of blastomeres (dividing cells) inside the embryo;
- difference in blastomere size;
- color and structure of cytoplasm of blastomeres (fluid inside cells);
- external diameter of the embryo;
- presence of underdeveloped or dead blastomeres;
- the integrity and shape of the protein-polysaccharide protective zone surrounding the one-cell embryo;
- the presence of vesicular junctions in the cytoplasm of blastomeres.

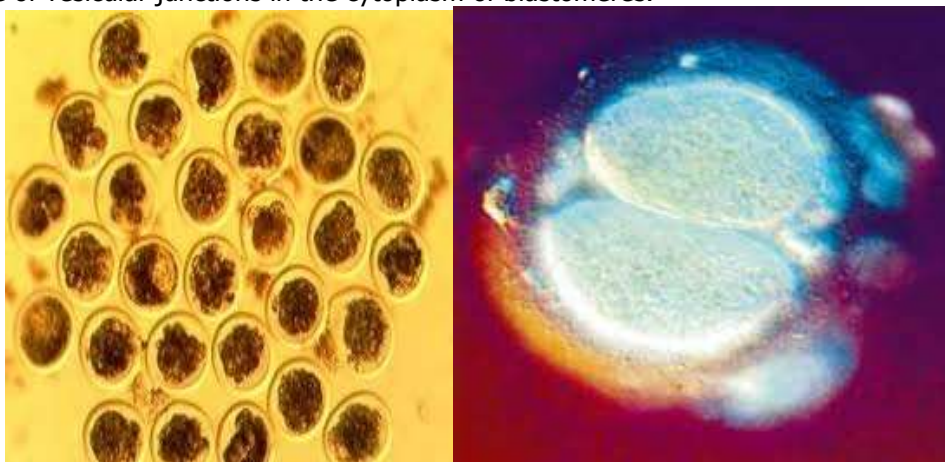


Figure 1. Underdeveloped blastomeres.

According to these criteria, embryos are evaluated as follows.

1st class - excellent and high quality;

2nd class - satisfactory quality;

Class 3 - poor quality;

Class 4 - dead and degenerated embryos

Selection and preparation of recipients. It is possible to get cows that have no problems with breeding and are easy to calve. A special diet should be selected for them in order to ensure a body fat of 6 points for beef cattle and 3-4 points for dairy cows. These cows should also come from a healthy herd.

For maximum survival of embryos during transplantation, the condition of the reproductive tract of the recipient should match the condition of the reproductive tract of the donor as much as possible. The reproductive cycle of the donor and the recipient must be synchronized at the same time.

For this, prostaglandin drugs are usually used. This method increases the probability of being at the same stage of the reproductive cycle as the recipient donor at the time of embryo transplantation. Donors should be inseminated during estrus and calving period. Usually, the transfer of the embryo to the recipient is carried out on the seventh day after the fertilization of the donor.

Embryo transplantation. The first thing a recipient needs to do for an embryo transfer is to place the embryo in a straw for artificial insemination. This operation is carried out under observation with a microscope using a 1 ml syringe.

As in the case of artificial insemination, a tool for embryo transplantation is also introduced into the recipient's cervix. Then the end of the tool goes to the horn of the uterus, next to which ovulation occurs in the ovary. In this case, you should act very carefully so as not to damage the mucous membrane of the uterine horn. Then, for transplantation, the piston of the syringe is pressed, and the embryo is removed from the straw into the cavity of the uterine horn. Then the device is also carefully removed from the genital tract.

To reduce the risk of damage to the lining of the uterus, the process of washing and refilling the embryos is carried out after epidural anesthesia, which allows to block the rectal contraction.

Embryos can be transferred immediately after being retrieved from the donor and evaluated, or they can be frozen and stored in liquid nitrogen until transplant. Freezing and thawing processes are very complicated and unsafe for the embryo's viability, so the pregnancy results from the transplantation of frozen embryos are 10-20% lower than the results from the transplantation of fresh embryos.

Frozen embryos should be labeled accordingly.

CONCLUSION

By implementing the process of embryo transplantation in our country, it is possible to quickly increase the herd of breeding cattle. Breeding of such herds can help to increase the volume of production of milk and milk products, meat and meat products.

Today, it is possible to reduce the number of purebred cattle exported from foreign countries, and to breed these breeds on the basis of orders.

The lack of laboratory equipment to carry out the process of embryo transplantation in the first place can be seen that we are not able to perform this process and we are not able to effectively use the advances of biotechnology in the field of animal husbandry.

In the implementation of the embryo transplantation process, based on the agreement with the Ministry of Agriculture of Korea, a lesson was organized for the scientific staff of the Animal Husbandry and Poultry Research Institute by a Korean embryo transplant specialist, and the scientific staff was informed about the achievements of biotechnology, the advantages, the process of embryo transplantation. was explained in a practical seminar.

In the near future, the leaders of the Korea Copy Center and the Animal Husbandry and Poultry Research Institute have ordered embryos for the purchase of ready-made embryos and use in the cattle of our Republic.

In the future, in cooperation with the Korean "Kopia" center, it was agreed to purchase laboratory equipment and start this embryo transplantation soon.

USED LITERATURE

1. Prasad, Jagdish, 2010 "Poultry Production and Management" – Kalyani Publication New Delhi.
2. Dr. Mayur Gopinath Thalkar.2018 "Embryo transfer technology in cattle"
3. Bolatbek Ateikhan, Toktar Karibaevich Bexeitov, Talgat Kozybakovich Seiteuov, Kairulla Kassenovich Akhazhanov, Maxim Viktorovich Sirovatsky and Sergey Valeryevich Beketov "Effect of Semen on the Embryo Productivity of Donor Cows and the Development of Transplant Calves".
4. https://www.cruachan.com.au/embryo_transfer.htm