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Popular Article

Transvaginal ultrasound-guided follicular puncture (Ovum Pick Up)

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Introduction

The Ovum Pick Up method involves using an ultrasound probe to aspirate the ovarian follicles to remove the oocytes transvaginally. The donor remains unharmed throughout this process, which takes 15 to 20 minutes and involves confining the donor in a cattle crush. Implicitly linked to in vitro embryo production (IVEP), transvaginal ultrasound-guided follicular puncture (Ovum Pick-Up) has emerged as a competitive alternative to superovulation in cattle embryo development. A Dutch team pioneered in vivo oocyte harvest in cattle using transvaginal ultrasound-guided follicle aspiration, or Ovum Pick-Up (OPU) (Pieterse et al., 1988). A reproducible and non-invasive method called "Ovum Pick-Up" (OPU) is used to extract a high number of viable oocytes from the antral follicles of living animals. The application of the OPU technology to buffalo species was first documented in 1994 (Boni et al., 1994). Galli et al. (1998) reported the production of the first buffalo utilizing the OPU and in vitro fertilization (IVF) combination of procedures. India's first cattle calf to be generated with OPU-IVF technology is named "Holi." Age, the time of year, and the stimulation of follicle stimulating hormone (FSH) all



influence the development of embryos from ovum pick-up oocytes. On average, 1-3 embryos are produced from oocytes collected per session. The first bovine calf (Holi) was created at ICAR-National Dairy Research Institute, after that Prasad et al. (2013) produced the first buffalo calf (Saubhagya) in India using this method.

Advantage

OPU benefits from the ability to obtain oocytes from less intrusive animals and from using superior animals as oocyte donors during the embryo transfer process Purohit et al. (2003). In addition to improving lifelong reproductive efficiency, this technique can be applied to follicle ablation to facilitate follicle turnover during the embryo transfer procedure. Studying the molecular complexity and the function of different cytokines during folliculogenesis is also made possible via follicular aspiration. A method of preserving genetic material from animals that are being slaughtered for meat or that are being killed to combat illness. Because ovum pick-up does not require the animal to have a normal reproductive cycle, it can be used in conjunction with IVF technology to greatly increase the possibility of producing more progeny annually than would be possible under normal circumstances, thereby shortening the generation interval and increasing genetic gain.

Disadvantage

The low yield of eggs per ovary and the need for skilled, experienced veterinary professionals and advanced equipment to perform this procedure.

Oocyte Recovery

Recovery of the oocytes from the ovaries can done by following techniques:

1. Oocyte aspiration using needles
2. Slicing the ovaries using scalpel blade
3. Follicle dissection from ovaries

4.Ovum pick-up from live animals

Collection by transvaginal ultrasound-guided ovum pick up

OPU is used to create embryos in vitro from live donor oocytes. OPU uses ultrasound-guided follicle aspiration to extract oocytes, making excellent utilization of females who are genetically desirable. 1) A twice-weekly OPU program raised the frequency of follicular waves. 2) a halt to ovulation, follicular development, and the oestrous cycle. The parameters of the aspiration vacuum and the needle are vital in establishing the amount and caliber of COCs that are



collected. In order to limit mechanical damage to the oocyte, aspirating antral follicles ≥ 2 mm in diameter from each ovary is done using a stainless-steel needle that is 50 cm to 55 cm long and has a 0.1-cm diameter or 18 gauge (Aquino et al., 2013). To aspirate the oocytes from the follicles utilizing a negative pressure of 40 mmHg, 68, 55–70 mmHg (Sakaguchi et al., 2019), or 110 mmHg depending on the machine, the ultrasound echo tip is a 5-MHz to 9-MHz micro-convex transvaginal transducer. OPU had no adverse effects, even after twice-weekly collections for more than a year, according to Gupta et al. (2006). However, in other cases, follicle recruitment declined, oocyte collection occurred with a decrease in developmental competence after the first two months of recovery, and the ovaries' surface hardened after many months of recurrent collections (Neglia et al., 2011). According to reports, superovulation plus OPU can be performed, at most, every two weeks to recover the oocytes prior to the commencement of oestrus.

Technical problems

About 80% of COCs begin to mature, and of those that cleave, about 45% of the blastocysts are recovered. Among the causes are: The system of embryo cultivation, COC Caliber, rates of cleavage and blastocyst integrity, count of embryos per each receiver, development of the embryo in sync with the recipient day of the oestrus cycle, kind of embryo (frozen or fresh) and environmental elements including diet and heat stress. Large calf syndrome and other fetal anomalies were formerly linked to issues with OPU and in vitro fertilization, however these issues have now been resolved and were caused by different elements of the original culture material.

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