



There are several new techniques that are being utilised in the field of equine reproduction, and many people may have come across **OPU** and **ICSI** as acronyms.

#### But what are they, and how do they work?

It is an advanced form of IVF and is now routinely used in the production of human embryos. If the sperm fertilizes the oocyte (egg) successfully, an early embryo develops. These are grown (cultured) in special conditions in the laboratory for 7-9 days - by which time they are equivalent to a 'normal' 4-5 day embryo. These embryos are very small and can therefore be successfully frozen and transported.

#### OPU- Ovum Pick Up (or Oocyte collection)

This is the first step in the process and is where oocytes are removed from the ovary.

#### ICSI - Intra-Cytoplasmic Sperm Injection

This is the procedure whereby a single sperm is injected through the outer surface of a mature oocyte, following which an embryo may develop.

#### How is this technique and procedure performed?

The mare is prepared, given sedation, antibiotics and an intestinal relaxant. Often a urinary catheter is placed and sometimes the mare is given an epidural. The ovary is located by the veterinarian with a hand in the rectum and gently moved so that it lies next to the vagina. A specialized vaginal probe with a needle guide attached is inserted into the vagina. The follicles (which contain the oocytes or eggs) are individually punctured, drained and scraped multiple times. The procedure is repeated for both ovaries. The retrieved fluid is then taken to the laboratory to be filtered and examined under a microscope. The oocytes are then assessed, washed and packaged for transport to specialized ICSI labs in Europe. Once at the lab, the oocytes undergo further maturation, the injection of the sperm and the early culture of the embryos. If required, the embryos can be biopsied (to allow genetic assessment e.g. for sexing\*) and then frozen.

\*not available at all labs

#### What are the advantages of OPU and ICSI?

- It can be performed at any stage of the reproductive cycle of the mare (and therefore at any time of year)
- Embryos can be stored in liquid nitrogen indefinitely & transferred when suitable recipients become available.
- Recipients do not have to be synchronized at the same time as the donor mare.
- Donor mares do not experience disruption to their competition schedules as part of an embryo transfer breeding program.
- Donor mares that do not produce embryos via conventional embryo transfer may be able to produce embryos via OPU and ICSI.
- In the case of sudden death or euthanasia, oocytes can be recovered post mortem & sent for ICSI.

- Only one sperm cell is needed for each injected oocyte and hence is very useful when the supply of semen is limited, for use with sub fertile stallions, or with extremely costly or exclusive frozen semen.
- A single straw of frozen semen can be used for up to 8-10 ICSI sessions

### What Results Can Be Expected?

The average oocyte recovery rate is usually 60-65% - i.e. an oocyte is recovered out of 60-65% of punctured follicles.\* After maturation, 60% of the oocytes will be injected with a sperm cell. The overall chance of one or more frozen embryos after a single OPU session is 60%. The average number of embryos per successful OPU session is 1.9. In summary, on average out of 10 different OPU-ICSI sessions, 4 attempts will be unsuccessful, although the other 6 successful attempts will have yielded 12 embryos in total.

\* NB These results may vary- some mares give a lower yield, and some higher

### Chance of Pregnancy

After thawing and transferring the ICSI embryos into a recipient mare, approximately 70-75% will result in a pregnancy.

### Things to Consider

Enrollment Criteria for an OPU/ICSI Program

- The mare needs to have swabs and bloods done and sent to the APHA laboratories in order that the oocytes can be sent to Europe.
- The mares ought to have at least 15 follicles on both ovaries - multiple smaller follicles is the most desirable situation.
- The presence of one/more large pre-ovulatory follicles will be a disadvantage.
- Frozen semen either already in Europe, or ready for export to Europe, with the relevant health papers must be available from the desired stallion.

### Side- Effects of OPU

It is important to realize that there are risks associated with many veterinary procedures - and the same is true of OPU.

Possible complications include:

- bleeding (rectal, vaginal or ovarian),
- rectal tears
- rectal or ovarian abscesses
- peritonitis

(Some of which in the worst-case scenario can lead to death of the mare)

There is a higher early embryonic mortality following transfer of ICSI embryos than with normal ET.

**Equibreed UK's Team are all experienced professionals who assess these risks, and if necessary, will stop the procedure.**

### Post Procedure Care

Mares will be required to remain at Equibreed UK overnight following their procedure so that they can be intensively monitored. The day after the treatment, some mares can be quiet with a reduced appetite, and possibly have an increased temperature. Occasionally they are lethargic for a few days. We recommend that they are not overexerted for several days and do not return to full work for at least 2 weeks.

