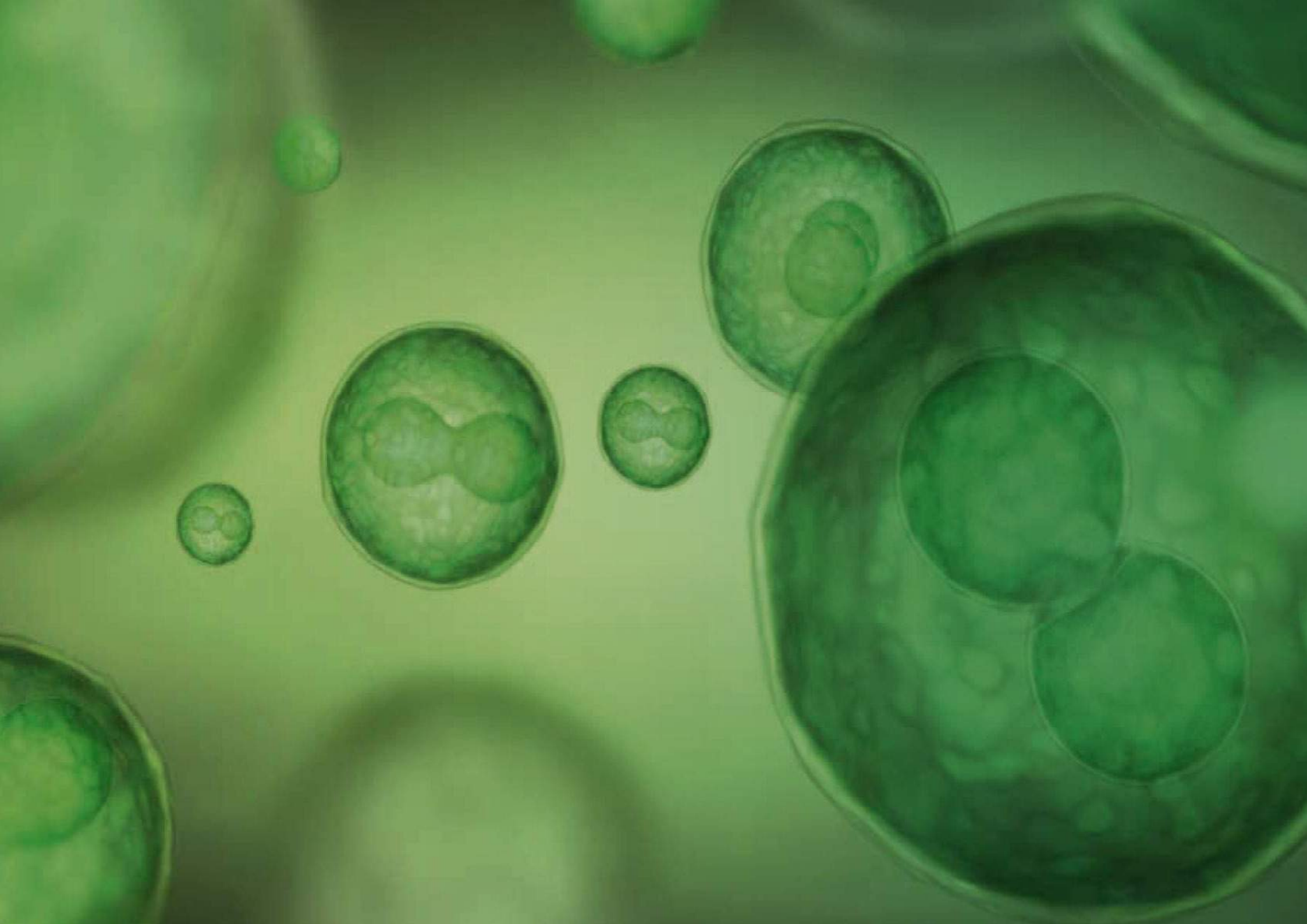
360°

UNDERSTANDING EMBRYO-TRANSFER (ET)

A GUIDE TO THE BENEFIT OF ET IN YOUR HERD

vetoquinol

ACHIEVE MORE TOGETHER



Embryo Transfer allows
one **superior cow** to produce
a **greater number of calves**
than normal in her lifetime

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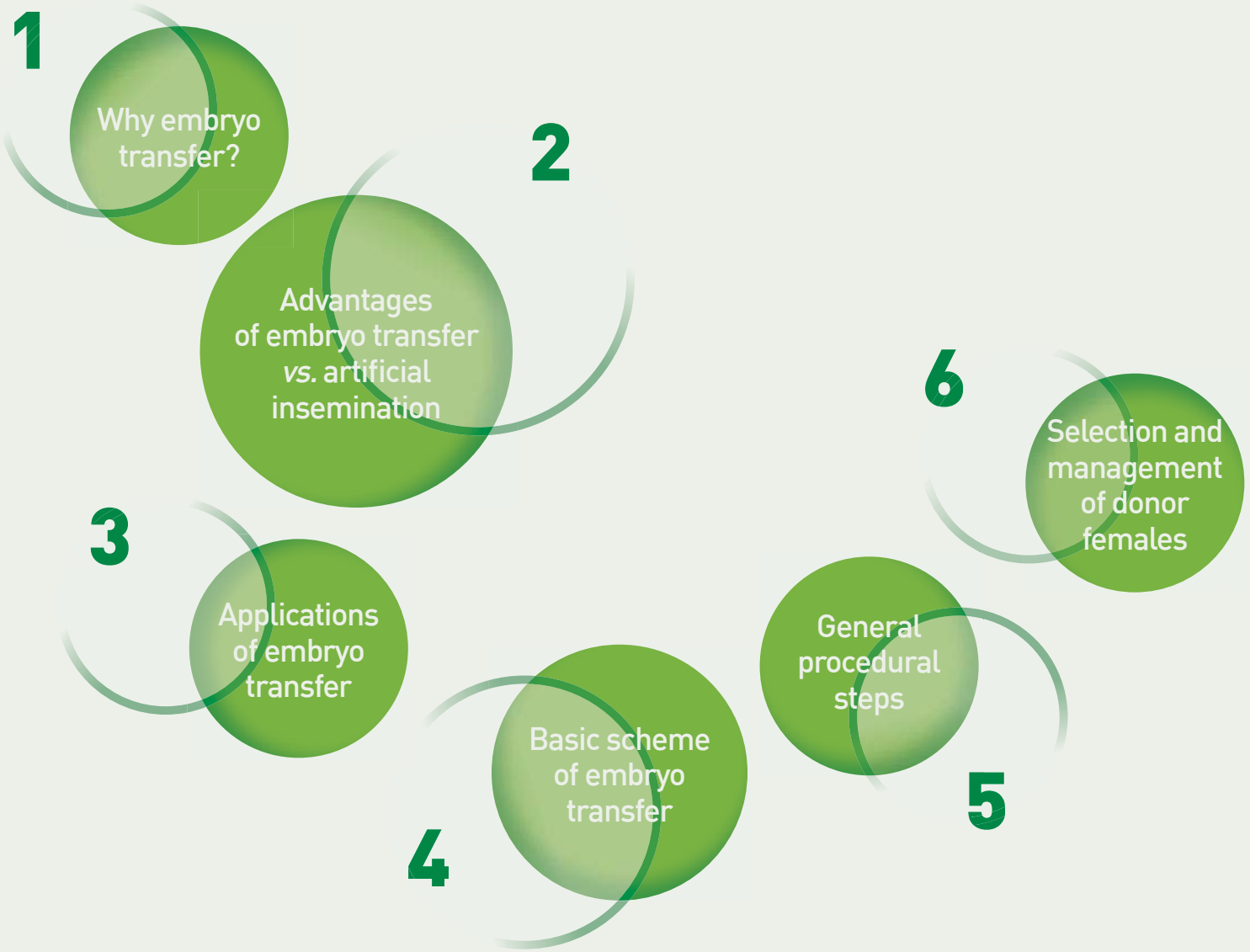


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1. WHY EMBRYO TRANSFER?

Bovine embryo transfer technology provides:

Rapid genetic improvement of the herd

Livestock breeders can choose to produce a **higher percentage of the offspring** in their herd from **selected donor females.** The use of an embryo transfer programme will result in more rapid genetic improvement than that achieved with artificial insemination alone.

Importing and exporting livestock genetics

Thanks to embryo transfer, **entire herds** can be transported in a **liquid nitrogen tank** at a cost that is often lower than that for transporting a single animal.

New genetics introduced with virtually no health risks

A producer can introduce **new genetics** into the herd with virtually **no risk of disease transmission.** It has been proven that embryo transfer essentially eliminates the risk of disease transmission when embryo collection, donor and sire health testing and freezing are conducted under OIE/IETS standards.

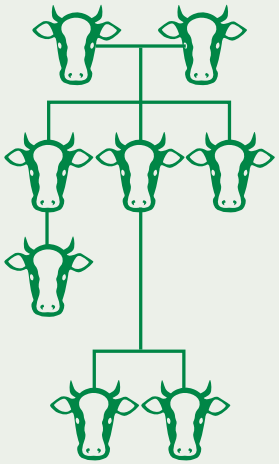
2. ADVANTAGES OF EMBRYO TRANSFER *VS.* ARTIFICIAL INSEMINATION

- ET provides the opportunity to disseminate proven, **elite combined genetics of both females and males.** AI only allows the dissemination of a **male's genetic potential.**
- ET results in **more valuable females.**
- Many breeders have identified individual females whose **offspring are more valuable** and therefore use them exclusively in ET.
- ET has also been used to rapidly **expand limited gene pools.**

3. APPLICATIONS OF EMBRYO TRANSFER

- **Genetic improvement.** Thanks to ET and due to the increased selection intensity and shortened generation intervals, **genetic gain** can be made on a within-herd basis and can even be **doubled** compared to the use of only AI.

- **Planned mating.** Embryo transfer provides the opportunity to disseminate the **genetics of proven elite females.** This procedure also permits the development of herds of genetically valuable females, most of which may be **sibs if not full-sibs.**



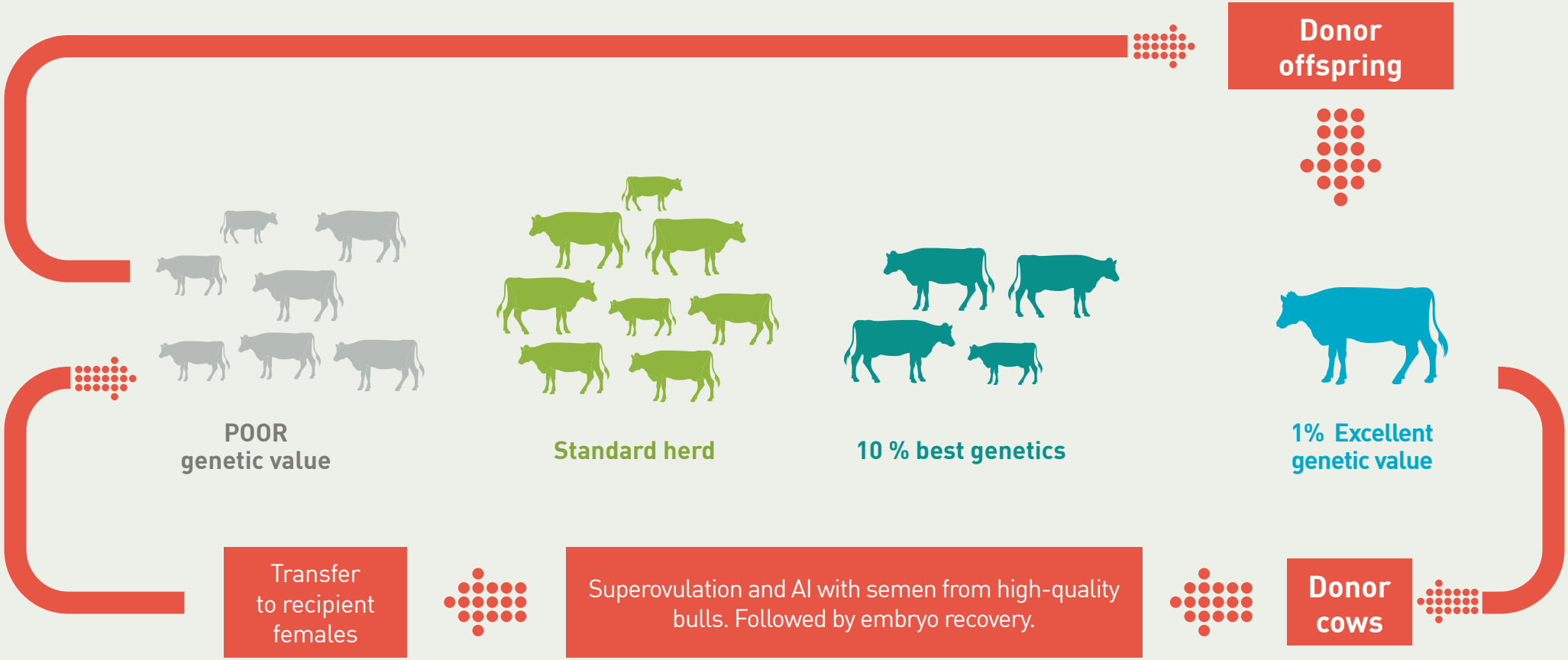
- **Genetic testing.** The success of multiple ovulation and embryo transfer programmes has led to the use of this technology to **genetically test AI sires.** Selected donor cows are superstimulated and inseminated with semen from the most highly proven bulls available. Bull calves are then proved by their **sisters' production records** rather than their daughters' records. With this approach, it is possible to **genetically test a bull** over a period of **3.5 years** as opposed to 5.5 years using traditional progeny testing.

- **Disease control.** None of the infectious diseases in cattle listed in Group 1 of the IETS manual have been transmitted when procedures were followed correctly. **Zona intact, washed bovine embryos** do not transmit the diseases listed in Group 1.

- **Import and export.** One of the biggest benefits of the international trade in embryos is the **reduced risk of disease transmission.** Additionally, thanks to ET an entire herd can be transported, in the form of **frozen embryos,** at moderate cost.

4. BASIC SCHEME OF EMBRYO TRANSFER

The use of an embryo transfer programme will result in a **higher percentage of the females** in the herd **coming from selected donor females.**

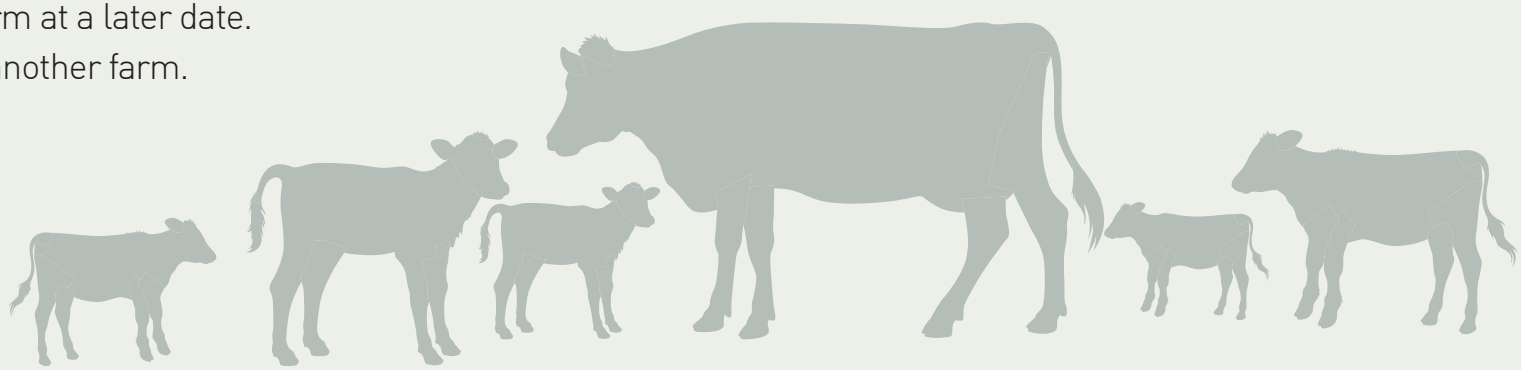


5. GENERAL PROCEDURAL STEPS

1. Identify donor and recipient females
2. Synchronise oestrus of donor and recipient females
3. Superovulation of the donor females
4. Artificial insemination
5. Embryo recovery
6. Embryo transfer
7. The recipients will give birth to calves that are genetically unrelated

Embryos can also be frozen:

- To be transferred in the same farm at a later date.
- To be implanted in recipients in another farm.
- To be sold to other producers.



6. SELECTION AND MANAGEMENT OF DONOR FEMALES

Do not make any management changes in the two months prior to implementing superovulation procedures and minimise donor stress.

1 Time after calving

Donor cows must have given birth at least 50 days before initiation of superovulation in beef donors and generally 60 to 90 days in lactating dairy donors. Post-partum donors should have resumed regular oestrous cycles, without reproductive disorders.

2 Age

Generally, maiden heifers should be well grown, at least 14 months of age and exhibiting regular oestrous cycles. There is no maximum age for cows in good reproductive health.

3 Good health status

Donors that are healthy, properly vaccinated and free from parasite infestation

4 Optimal genetics

- Excellent genetic value, ideally genomically tested.
- Select cows with good traits of economic importance.
- Discard cows with genetically transmitted diseases.

5 Nutrition

Appropriate nutrition level (increasing plane of nutrition), with no specific nutritional deficiencies. The use of chelated minerals may improve superovulatory response and embryo yield. Avoid pastures that are too green or high in legume content; pastures with high content of clover and lucerne may have a negative impact on embryo production.

7. SUPEROVULATION

The objective of superovulation is to increase the number of embryos that can be transferred to recipient females, from a single donor cow. This enables multiple pregnancies in one year from the single elite cow.

- Donor females are superovulated using a series of treatments that can be supplied by your veterinarian.

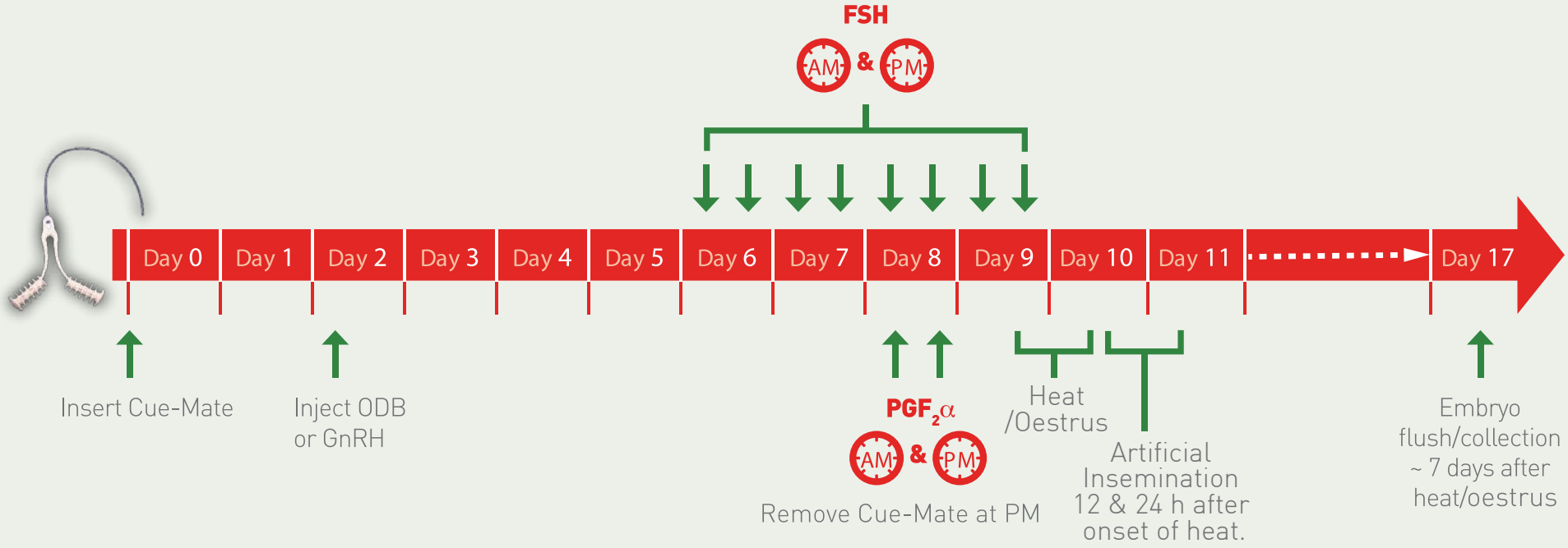
- Over the years, time and effort has been invested in improving superovulation treatments. Now, ovulation synchronisation treatments can precisely predict the timing of ovulation. This will allow you to pre-schedule and reduce the amount of labour required to run an effective ET program.

- This progress has transformed **superovulation treatments** into **more accessible and manageable tools,** thus contributing to spread embryo transfer technique around the world. Today, a well managed superovulation program can put Embryo Transfer within reach of commercial producers worldwide.

7. SUPEROVULATION

Standard protocol for superovulation

Cows are treated with FSH to enable superovulation.
The biological half-life of pituitary FSH in the cow has been estimated to be 5 hours or less. Thus, traditional superovulation protocols usually involve **8 separate injections of FSH** administered twice daily over a 4-day period. Other treatments, that include the use of the Cue-Mate device allow for the precise timing of the onset of oestrus and ovulation.



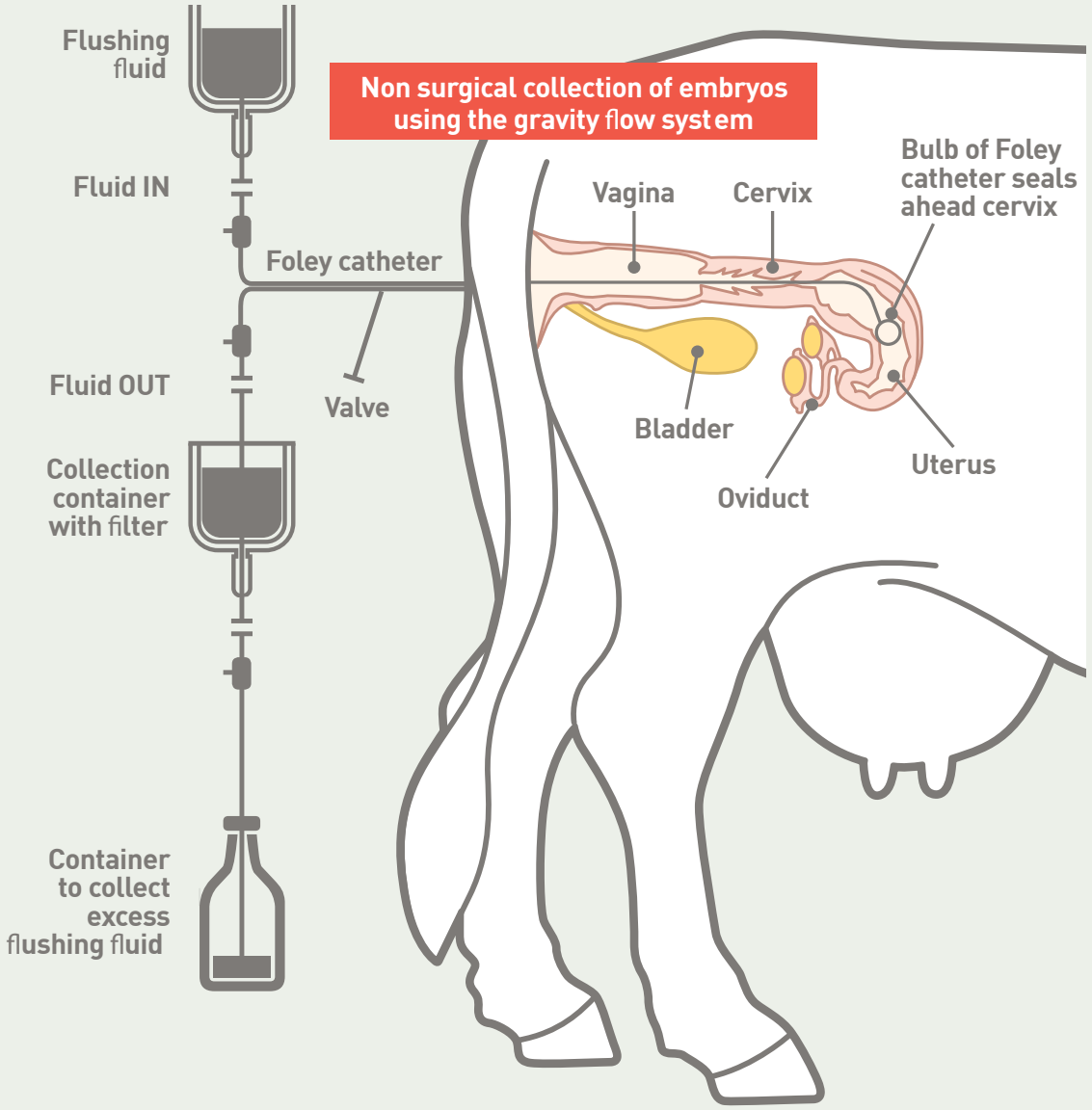
8. RECOVERY OF EMBRYOS

Non-surgical embryo recovery procedures have totally replaced the various surgical procedures that were used in the early days of the ET industry. Embryos are recovered with the use of a soft catheter that does not damage the reproductive tract. This procedure can be repeated multiple times on a donor and is easily performed on farm.

To perform **embryo collection** from the donor cow, a vet will administer an **epidural anaesthesia and immobilise the cow in a crush.** This technique is performed hygienically, to ensure optimal results and ongoing maintenance of donor cow health.

The most widely **non-surgical methods** used for embryo recovery are:

- Gravity flow system.
- Syringe system.



9. HANDLING OF EMBRYOS

Although the embryos are usually transferred as soon as possible after their collection, it is possible:

- to maintain them for at least 12 hours at **room temperature** in a holding medium,
- to cool the embryos in a holding medium and keep them **chilled** for 2- 3 days,
- to **freeze the embryos** and use them at a later date.

Discuss with your ET technician the best option for your herd and your business. Embryos can be frozen on site, for implantation at a later date or for sale purposes.

10. EMBRYO TRANSFER

The ET technician will assess the **recipient suitability** to receive an embryo by confirming synchrony of oestrus and the presence of a functional CL.

Restrain the recipient cow in a crush, and the veterinarian will administer an **epidural anesthetic,** and clean the cow's vulva.

The **embryo** is loaded in a 0.25 ml straw and the **straw** is loaded in the embryo transfer **pipette.** The **sheathed pipette** is passed through the vulvar labia while avoiding contamination.

The pipette is passed through the cervix and is transfered into the **embryo** mid-section of the **uterine horn** adjacent to the ovary bearing the **CL.**

An average of **8 to 10 ova/embryos** are collected from each superstimulated donor cow and **5 to 6 embryos** are transferred, resulting in **3 to 4 pregnancies.**

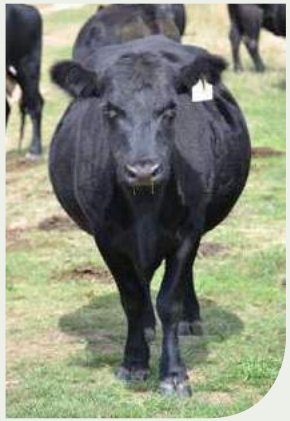
Pregnancy rates are generally around **60% with fresh embryos** and range from **50% to 60% with frozen embryos.** However, as per normal fertility variations in season, breed, and status of the cow can cause variation in results.

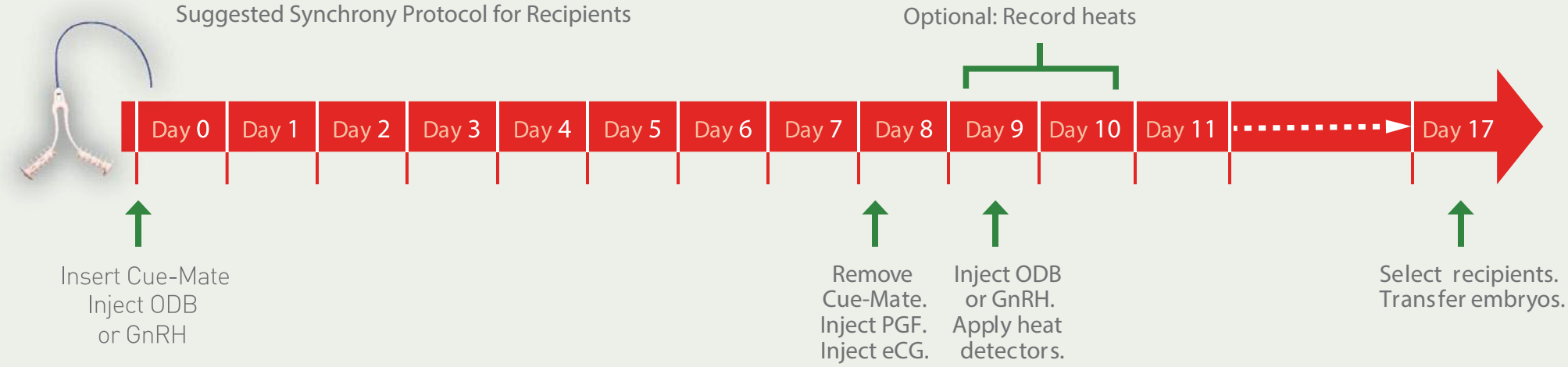
11. SYNCHRONISATION OF OESTRUS FOR EMBRYO TRANSFER

The highest pregnancy rates in recipients are achieved when oestrus is no more than 24 hours before or after that of the embryo donor female.

Recipients can be selected for an embryo transfer programme by detection of natural oestrus in untreated animals or by detection after oestrus synchronisation.

Your ET technician will provide you with a detailed protocol to synchornise your donor cow and recipient females. It is essential that the protocol is followed to ensure optimal results and precise timing of ovulation.





11. SYNCHRONISATION OF OESTRUS FOR EMBRYO TRANSFER

FTET

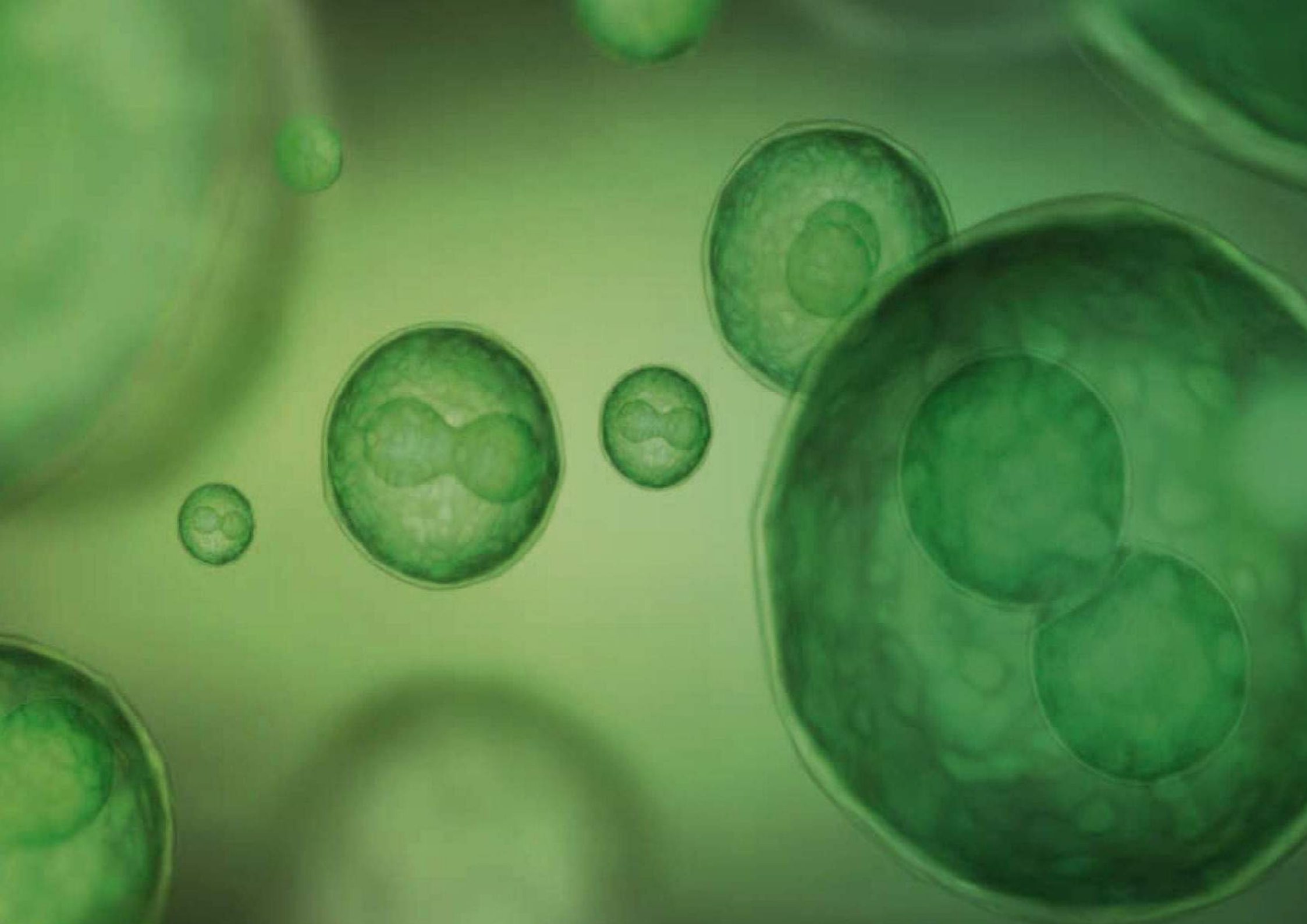
Detection of oestrus in recipients is not always a feasible option.

When herd size is large, there is low availability of qualified labour, or the expression of oestrus of the cows is poor, Fixed-Time Embryo Transfer (FTET) is a viable option.

FTET allows for embryos to be transferred into recipients **without oestrus detection.** To enable FTET, the recipients must be treated to synchronise the time of ovulation. Protocols that incorporate the use of a Cue-Mate device can be used. Your ET technician can supply and tailor these protocols to your herd and your needs.

Recipient females are synchronised to ovulate at a similar time to the donor female. There is no need to detect oestrus in these recipients: at the time of embryo transfer (7 days later) the technician will be able to assess the recipient's ovarian structures to confirm that she has had an ovulation at the appropriate time.

The use of FTET has been widely adopted and consistently yields good results. As more females are synchronised, **FTET normally results in more recipients being available** for embryo transfer than what is observed in oestrus detection only programs.



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