

Tutorial:

Reproductive Management in Animal Breeding - 03

Animal Breeding - AAT 31022



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Manipulations of Reproduction

- ~~• Induction of estrus cycle~~
- ~~• Control of (Visual) estrus (estrus synchronization)~~
 - Control of Ovulation
 - Super – Ovulation & Embryo transfer
 - In-vitro fertilization

Control of Ovulation

Ovulation

The increasing size of the follicle and its position in the cortex of the ovarian stroma cause the follicle to bulge out from the ovarian surface

Wall become thinner and avascular

Follicle wall degenerates

Rupture → Ovum will come out

Procedure ...

- Ovulation time critically important for planning fertilization.
- We have to confirm **actual ovulation** rather than **behavioral estrus**.
- Ovulation induce by **exogenous gonadotropins hormones**.
- Ex: hCG or GnRH – using bolus injection
- Inject exogenous hormones at beginning of behavioral estrus.
- It will act on LH → support to final maturation of developing follicle
- AI done within **18 – 24 hrs**. just after the injection.

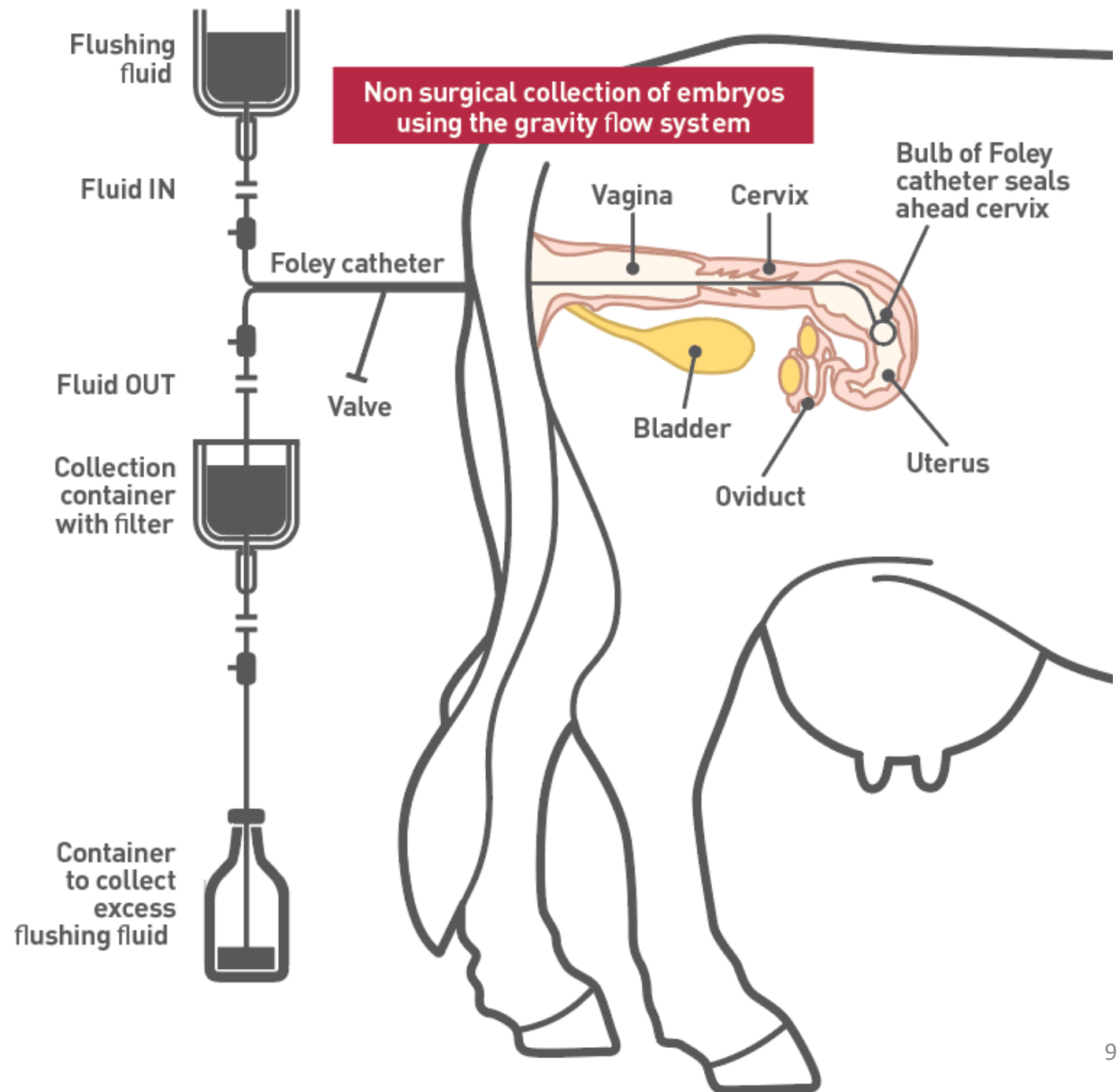
Super Ovulation & Embryo Transfer

Intro

- Superovulation is the bunch of processes to have the female to produce **more eggs**.
- By **gonadotropin hormones** and to increase the number of embryos.
- **Donor animal** – who giving more ova, that genetically superior animal

- **Ten or more live eggs** can be collected in each estrus from appropriate super ovulated cows and heifers.
- Approximately **5** transferrable embryos can be collected upon **85%** of super ovulated normal fertile donors.
- Usually **FSH** and **PMSG** are used for superovulation of cows

Eggs or embryos collection

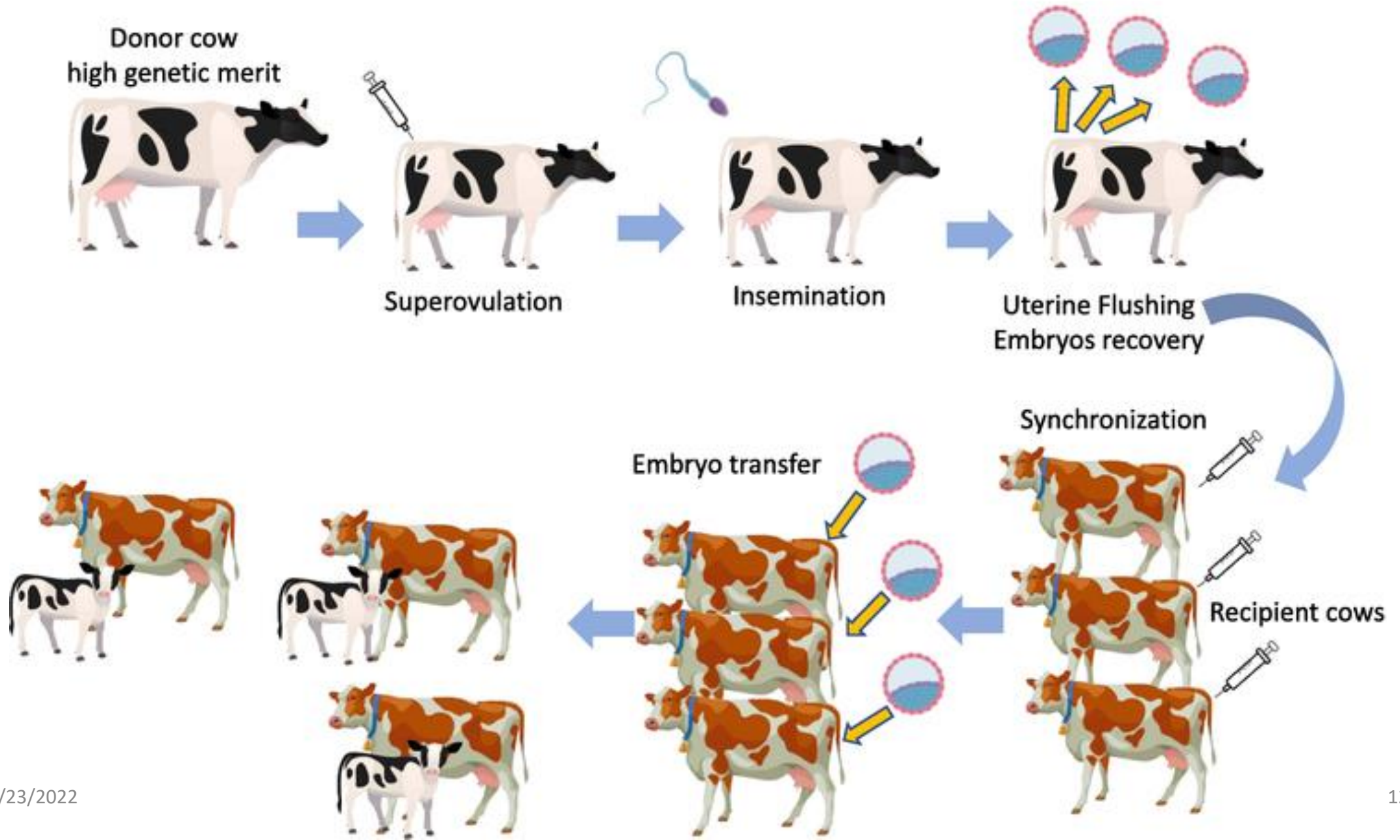




Embryo Transfer

- Produced ova subjected to **in-vivo or in-vitro** fertilization
- Fertilized embryos transfer to another animal (recipient)
- Recipient – who receiving embryos, **already prepared** for receiving embryos

IN VIVO EMBRYO PRODUCTION

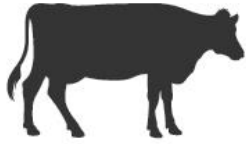


DONOR COW

SUPEROVULATION

1

8 to 12 days post estrus
OR Follicular wave
manipulation



2

5 days after
initiating
superovulation



INSEMINATION

natural or artificial

3

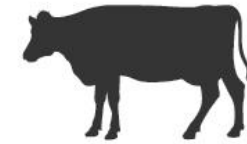
6 to 8 days after
Insemination non-
surgical recovery
of embryos

RECIPIENT COW

FLUSHING

5

1) Isolation & classification of embryos
2) Temporary holding of "fresh" embryos **OR**
2) Freeze embryos indefinitely in liquid nitrogen
at -196°C



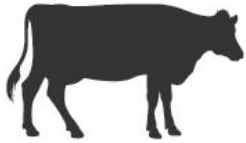
4

Detect natural
estrus **OR**
Fixed time
embryo transfer

SYNCHRONY

natural or pharmacological

6



7

Fresh embryo inholding,
to recipient cow.
Embryo in liquid nitrogen,
"direct" or "thaw" procedure
before transfer to recipient cow.

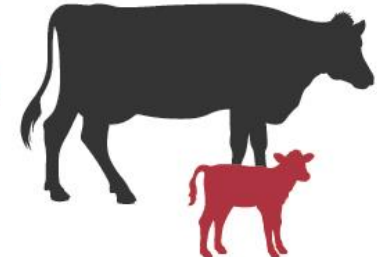


EMBRYO TRANSFER

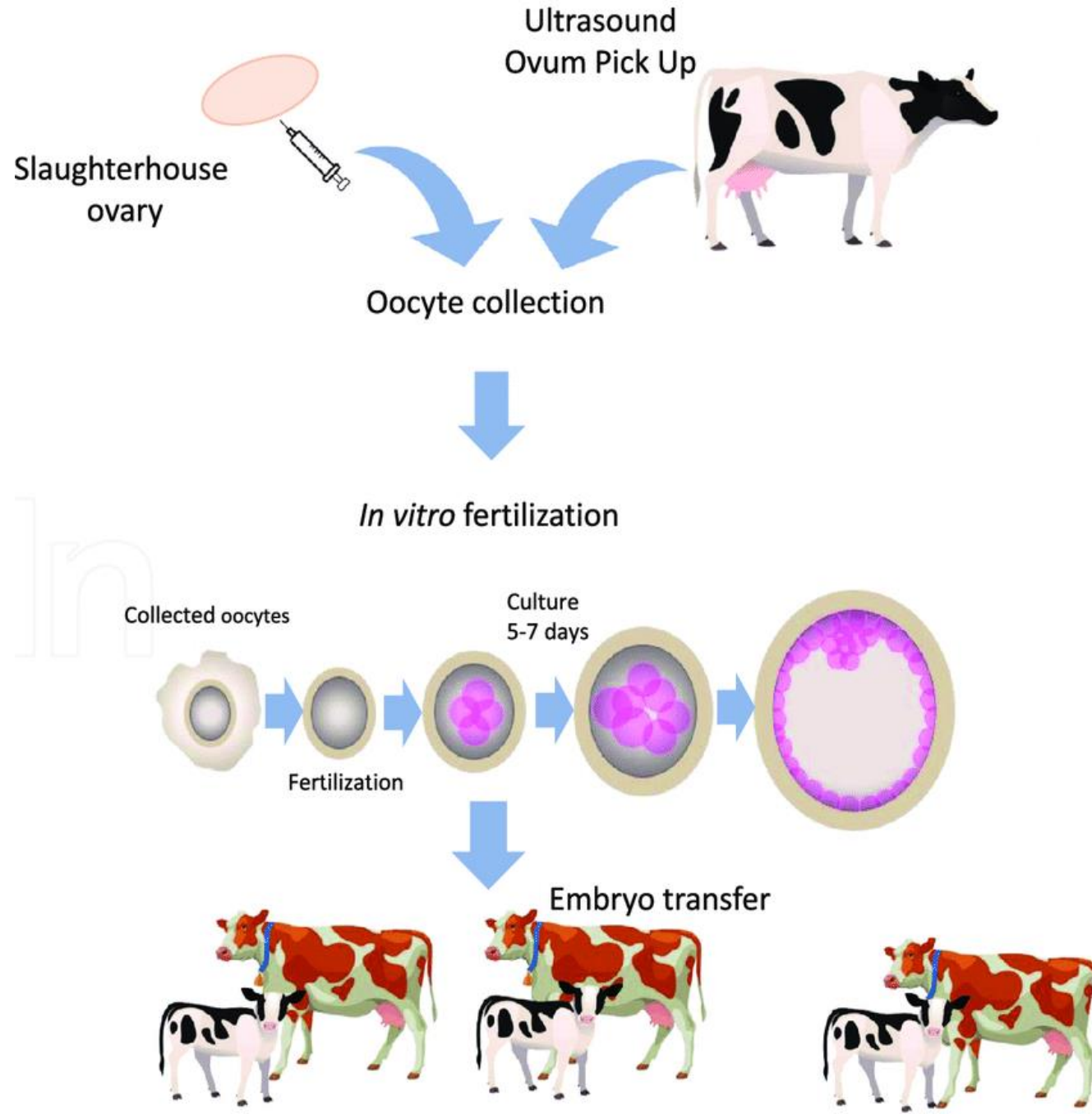


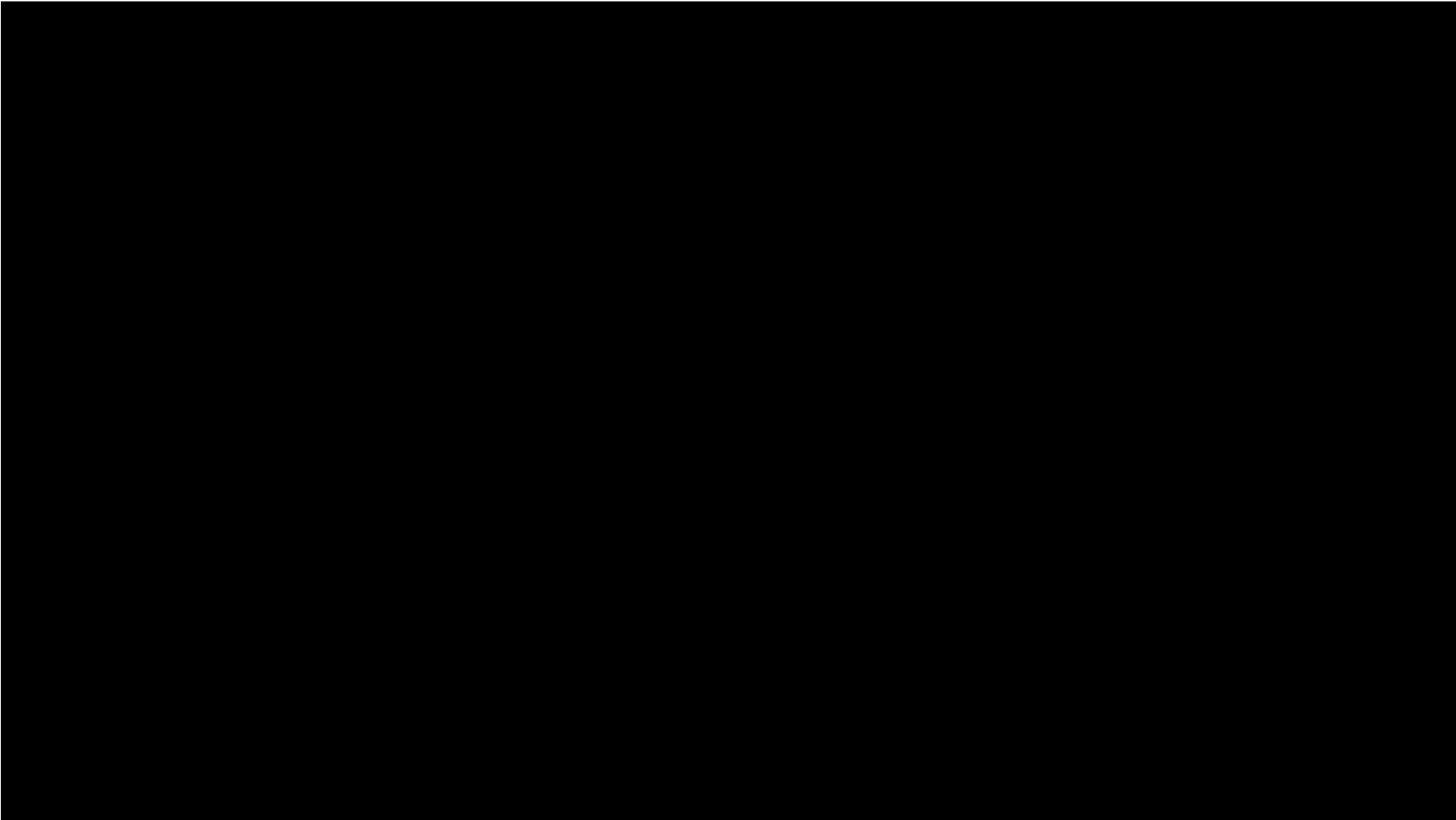
8

9 months
later



IN VITRO EMBRYO PRODUCTION





In-vitro Fertilization

- In Vitro Fertilization (IVF) is also known as an Aspiration or Ovum Pick Up.
- During IVF, **unfertilized eggs are harvested directly from the animal.**
- Recovered eggs are fertilized **one day after** they've been aspirated.

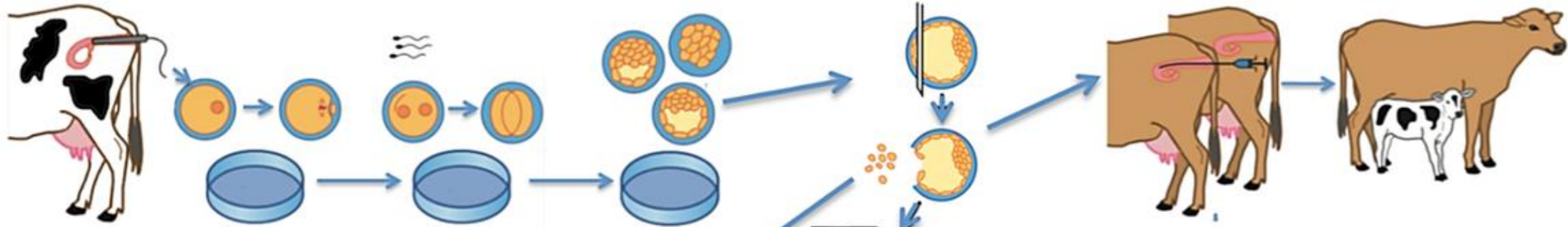
Ovum-pick-up
(OPU)

In vitro
maturation
of oocytes
(IVM)

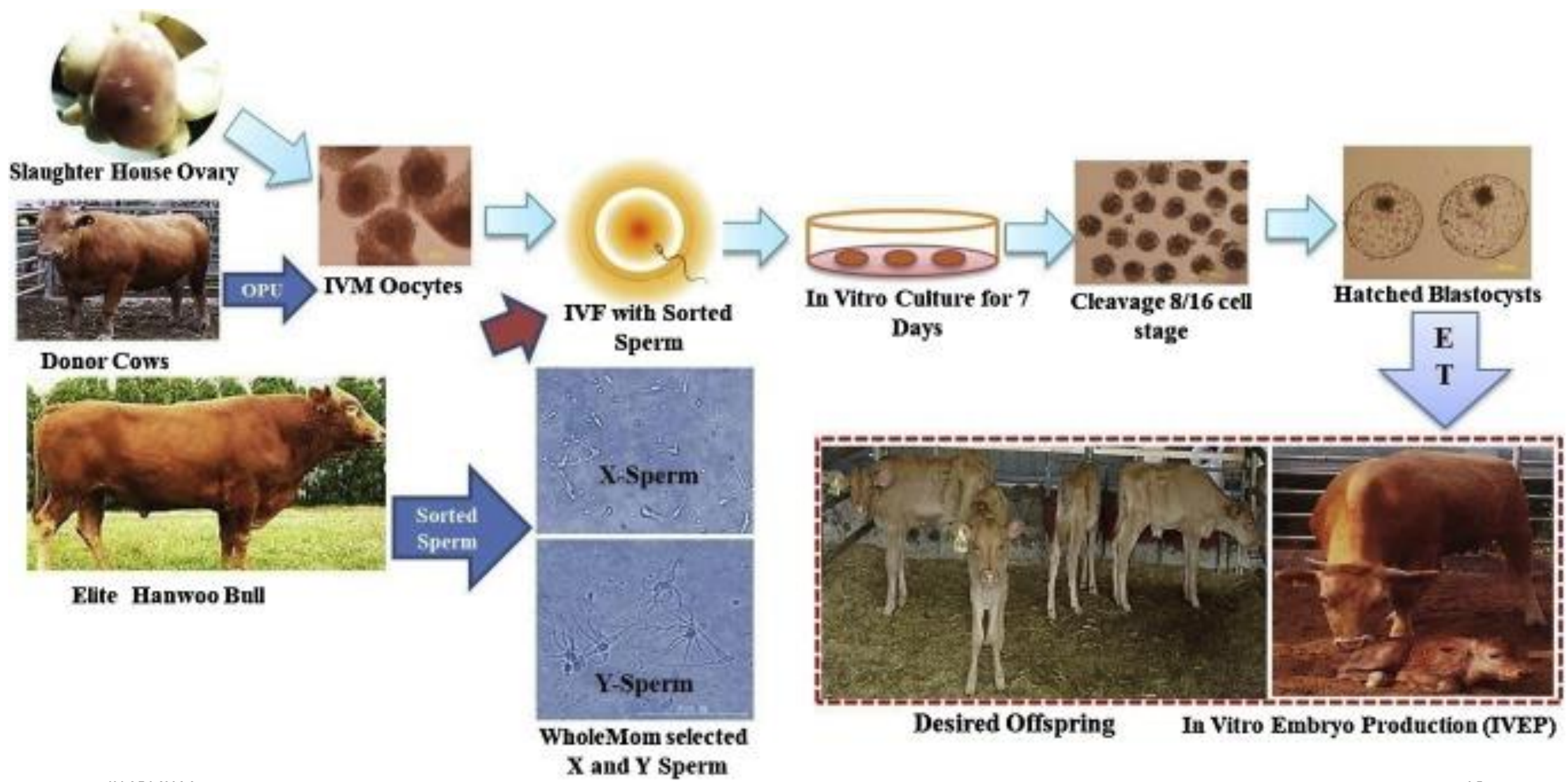
In vitro
fertilization
of oocytes
(IVF)

In vitro
culture of
oocytes
(IVC)

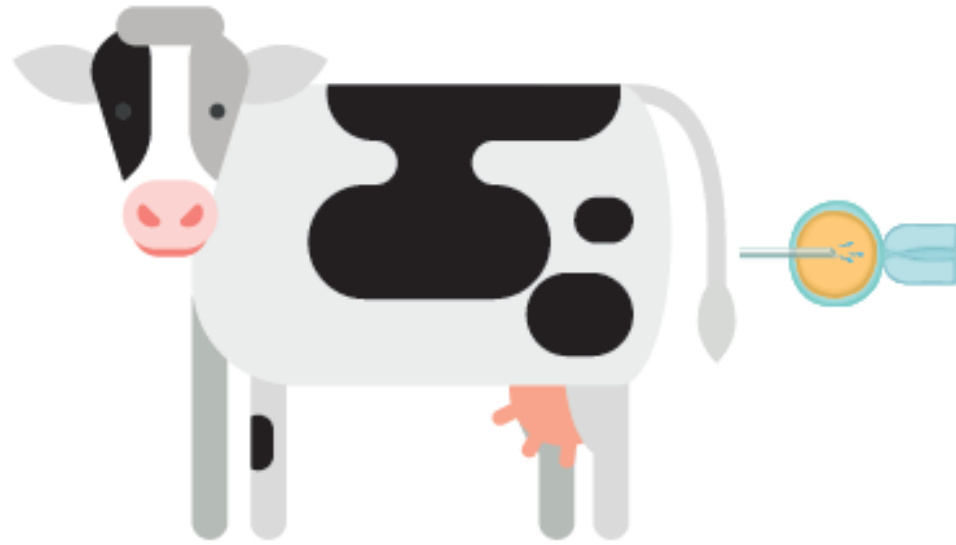
Biopsies and
cryopreservation
of embryos



Genomic selection
of embryos



MOET AND IVF



Multiple Ovulation and Embryo Transfer (MOET)

- The donor cow receives hormonal treatments to produce multiple eggs.
- The cow is inseminated after showing a standing heat and her embryos are flushed from the uterus a week later, before being transferred fresh into recipient females or frozen in liquid nitrogen for future transfer.



In Vitro Fertilization (IVF)

- Promotes high egg production.
- Unfertilized eggs collected from the donor cow via ovum pick-up, are transferred to a laboratory.
- Eggs are matured and fertilised 24 hours later.
- The resulting embryos are transferred into recipient cows or stored in liquid nitrogen (vitrification).

Thank You

Any Clarifications?

Report Submission

- You have to write a report, including below content;
 1. Give a flow chart (including steps-by-steps) for in-vitro fertilization (IVF) in cow
 2. Compare embryo transfer(ET) and in-vitro fertilization(IVF) (write in points)
- Make your report
- Submit via **VLE**
- **Due date: 29th of April 2022**