

IN VITRO FERTILIZATION (IVF) FAQ

What is the difference between embryo flushing and IVF?

- Conventional embryo flushing is an in vivo process, which means the eggs are fertilized in the donor and the embryos are then flushed out, for fresh embryo transfer or freezing.
- In vitro fertilization, or IVF, is a process of taking oocytes (unfertilized eggs) from donors and fertilizing them in the lab to produce embryos eight days after the ovum pick-up.

How long does the ovum pick-up (OPU) process take?

- OPU time per cow varies based on follicle numbers, but on average it takes about 10 to 15 minutes per donor.

How safe is the OPU procedure?

- Oocyte collection is an extremely safe procedure, with very low risk to donors.
- Prior to the procedure, the donor will receive epidural anesthesia, blocking all sensitivity of the ovaries.

How frequently can OPUs be done?

- Ovarian tissue is capable of extremely fast regeneration, allowing safe collection from the same donor as soon as seven days after the first collection. Work with a Vytelle technician to customize an OPU schedule for each donor, depending on embryo needs.
- For best results, we recommend that most donors be aspirated every two weeks.

What animals are considered qualified donors?

- The animal must be physically mature enough for our technicians to perform the OPU procedure. Because our process does not require hormone treatments to set up donors for OPU, a qualified donor can be any female in your herd, including heifers as young as 6 months of age, open cows

past 15 days postpartum, and pregnant animals up to 100 days of gestation, or until the ovaries cannot be accessed due to fetal size.

- IVF is no longer just for elite show animals. With Vytelle, all producers can accelerate their herd's genetic progress using their donors of choice.

What type of facilities are needed for OPU collection?

- Customers bring their animals to a Vytelle satellite center for OPU collection. Our Vytelle technicians and partner locations are known to collect oocytes from cattle in a chute or headlocks (USA).
- When our OPU teams go to producers' farms, Vytelle requires a secure chute with access to power, and a clean room with a table, seat and power for the lab equipment.

What is the average number of oocytes collected per breed?

- In dairy cattle, the average number of oocytes collected is around 12 oocytes per donor.
- In beef cattle, average oocyte collection is around 16 oocytes per donor.

Do I need to give my donor shots before undergoing the Vytelle's IVF process?

- No. No set-up is required prior to Vytelle's OPU process. Vytelle's IVF process does not use follicle stimulating hormone (FSH) at any point. This allows producers the opportunity to select any donor at any time for IVF. And this has several benefits for the animal, the product and your business.

Do you see differences in the number of oocytes harvested when FSH is not used?

- Our field trials don't show a difference in the number of oocytes collected or the quality, with or without the use of FSH.

- Vytelle's certified technicians are trained to collect oocytes without the use of FSH and can achieve collection rates similar to those of animals given FSH.

Does the donor's age have an effect on the number of oocytes and embryos produced?

- Yes. Young and prepubertal donors can produce many oocytes, but do not have good embryonic conversion.
- Estimate a 30% embryo production rate from the oocytes collected from mature donors and 22% for prepubertal females.
- We can collect from animals as young as 6 months of age, but once a heifer reaches sexual maturity or first heat, results do tend to improve.

How long after breeding a donor can I bring her in for OPU?

- OPU can take place any time from four days post breeding, up to 100 days of gestation.
- Keep in mind that the embryo is most susceptible to stress between days 5 to 42 after breeding. Yet, stress from transportation is likely greater than and stress from the OPU process itself.

When will I receive my final embryo numbers after OPU?

- Vytelle refers to the OPU date as Day -1. Embryo production finishes on Day 8, or the ninth day after OPU.

How many straws of semen do I need to fertilize oocytes?

- One straw of high-quality conventional semen can be used on up to 12 donors.
- One straw of high-quality sexed semen may be good for up to five donors.
- One straw of high-quality reverse sorted semen can be good for up to three donors.
- The number of straws may change according to the total number of oocytes collected from donors, and the semen quality. We recommend sending two straws for each sire and having a backup mating at the lab as well.

What is reverse sorted semen?

- Reverse sort is a technology that sorts semen

for a chosen gender from a conventionally frozen semen straw. We have a partnership with ST Genetics. They will thaw and sort a conventional straw on the day of fertilization.

- Because this process takes multiple hours per sample, we have a limited number of sorting spots available per day. Please contact your local POWERED BY VYTELLE™ satellite manager for availability.

When do you need the semen?

- The semen will be used on the day after the OPU collection. The semen can be picked up the same day of the oocyte collection, if a team is driving to the OPU location.
- If the OPU team is flying, semen should be shipped to the lab one week before the collection. Please contact your local POWERED BY VYTELLE satellite manager for coordination.

Can you mate multiple sires to one collection of oocytes?

- Yes. If more than 30 oocytes are recovered from a donor, multiple sires can be used to mate the oocytes to the sires of your choice.

Can I export my embryos?

- Yes, however, exporting embryos will depend on two factors:
 - A health certification and additional testing is needed for each donor before collection.
 - Each country has different requirements for export, so please let us know your interest in exporting your embryos in advance of the OPU.

What about embryo quality?

- Embryos are graded on a scale of 1 to 3, where Grade 1 is the highest quality and Grade 3 is the poorest.
- With Vytelle's outcomes-based pricing, you pay only for the Grade 1 embryos produced. Grade 2 embryos are available upon request.

What is the average number of embryos produced per breed?

- In dairy cattle, average embryo production with conventional semen is three Grade 1 embryos per donor.

- In beef cattle, average embryo production with conventional semen is six Grade 1 embryos per donor.

**Note, pre-sorted or reverse sort semen may decrease embryo production.*

When should my recipients be in heat?

- For fresh embryo transfer (ET), recipients need to be in heat on the oocyte collection day (Day -1) and/or a day after the oocyte collection day (Day 0).
- Recipients can be synchronized, or heat detected, for ET 7- and 8-days post heat.
- Synchronization protocols including 7-day Co-synch, 5-day Co-synch, Double OvSynch, and single or double prostaglandin injection, can be used to maximize recipient utilization on a single ET day.

How are fresh embryos transported to the farm and how soon do embryos need to be transferred after leaving the lab?

- Fresh embryos go to the farm in a portable straw incubator and must be transferred as soon as possible.
- If the distance to be traveled is too far for AM loading and transfer, embryos can leave the lab in the afternoon of Day 6.

Are any eligible recipients skipped during implantation?

- All recipients are checked for an adequate corpus luteum (CL) before an embryo is implanted.
- On average, about 5-10% of recipients are skipped during implantation.

Can I use Vytelle's IVF process in my organic cattle operation?

- Yes! Vytelle's IVF process may be used on organic dairy operations because our process does not require the use of hormones.

Do I need to use the embryos right away or can they be frozen?

- Embryos may be used fresh and implanted directly into qualified recipients or they may be frozen for future implantation. Implanting fresh embryos does provide better results.

What process do you use for frozen embryos?

- Our embryos are produced so that direct thaw can be used when you are ready to transfer them. This makes it convenient for a trained embryo transfer professional to implant the embryo into a recipient.

What is your fee structure?

- Our payment structure is very simple: You pay only for the embryos produced. There are no hidden fees at any step of the process. The only payment you make is when you receive your Grade 1 embryos (fresh or frozen).
- If you desire fresh or frozen Grade 2 embryos, please discuss this option and pricing with a POWERED BY VYTELLE satellite manager.

What pregnancy rate do you expect with IVF embryos?

- In a well-managed donor and recipient herds we expect pregnancy rates between 5 and 10% below the fixed time artificial insemination pregnancy rates.
- For fresh embryos, the Grade 1 pregnancy rate is near 45-50%, and the Grade 2 rate is around 35-40%.
- For frozen embryos, the Grade 1 rate is near 40-45% and the Grade 2 rate is around 25%.
- The averages can vary according to the breed.



Vytelle

Vytelle is a precision livestock company reshaping how cattle producers worldwide optimize their herds. Through Vytelle's integrated technology platform, generations of genetic gains can be made in just a few years. This allows producers to sustainably deliver more protein with fewer inputs, helping to ensure meat and milk are viable, competitive food choices for future generations.

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