



Maximizing Maternal Genetics with IVF

**New technology aids producers in
enhancing their embryo removal rate.**

Hereford breeders from Texas to Washington and beyond are using advanced in vitro fertilization (IVF) technology to maximize the genetics of high-value females and to fast-forward herd progress. Their secret is a simple and all-

natural method of IVF, eliminating the need for follicle-stimulating hormone (FSH) to collect eggs from donor cows.

James Holder, herdsman at Humphreys Farm and Ranch in Grandview, Texas, is in the fifth year of a herd building program relying completely on non-FSH IVF to amplify the genetics of elite Hereford females. The herd's evolution started with STAR KKH SSF Mirror Image 286W, a proven showing champion owned by Mallorie Phelps and Cutting Edge Cattle Co. Through an embryo partnership, Gary and Claudia Humphreys, owners of Humphreys Farm and Ranch, started utilizing this outstanding female as a foundation for their building program in 2014.

Front pasture cow

"286 is an incredible cow from the ground up and we believed she could have a strong place in the Hereford breed," Holder comments. "I like to raise females that are feminine and superior from a maternal standpoint, and 286 is a prime example."



Humphreys Farm and Ranch rebuilt its herd around the foundation of STAR KKH SSF Mirror Image 286W.

"The ability to aspirate a cow every two weeks, especially while she is bred, keeps her working as a normal cow while still maximizing embryo production."

— James Holder

To maximize this cow's genetic potential, Holder started her on the non-FSH IVF program. Reproductive specialists at the Hoofstock Genetics facility in Ranger, Texas, initially started collecting her oocytes, or ovum, every two weeks. This technology allows collection even more frequently — as often as weekly.

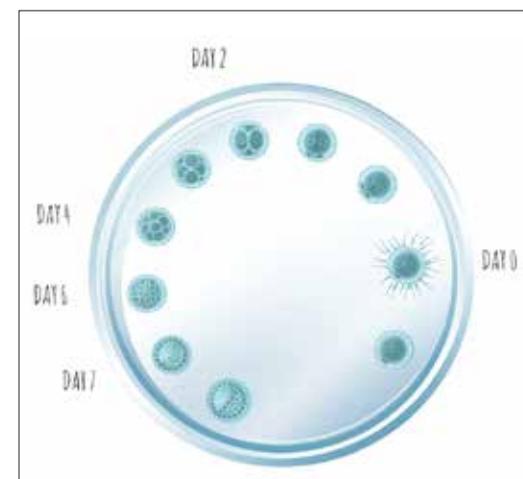
The ovum pickup (OPU) procedure uses an ultrasound-guided transvaginal device and a small needle to aspirate the follicle contents. It takes an average of 12 minutes per donor. Because the system does not require hormone treatments to set up donors for OPU, any female in the herd can be a qualified donor, including heifers as young as six months old, cows as early as 15 days after calving and pregnant cows within the first two trimesters of gestation.

"The ability to aspirate a cow every two weeks, especially while she is bred, keeps her working as a normal cow while still maximizing embryo production," Holder says. "We run her through the chute one time to collect her eggs and then she goes back into her natural environment in the donor pasture. It's much easier on the animal and less labor compared to traditional IVF methods that involve scheduling FSH shots and running cows through chutes over and over."

After OPU, Hoofstock Genetics lab technicians clean and sort the collected oocytes, fertilize them with the semen from Holder's chosen sire or sires, and develop the resulting embryos for implantation into recipient females. It takes seven days for the embryos to develop using the proprietary culture system that matches the culture medium precisely to the needs of bovine embryos.

Using this process, the Humphreys' cow has generated dozens of offspring, including a pair of yearling bulls that showed at the National Western Stock Show in Denver last winter.

"In less than five years we are starting IVF work on the third generation of offspring from our original 286 donor cow," Holder says.



The embryo development process takes seven days from fertilized egg to an embryo ready for implantation.



CECC MRP Stockmans Image 1511, known as “101,” is a key component of the non-FSH IVF program at Humphreys Farm and Ranch.



Ultrasound-assisted OPU allows technicians to clearly see 101's follicles to aspirate.



CECC MRP Stockmans Image 1511 awaits OPU at Hoofstock Genetics. Through non-FSH IVF, 101 had 16 calves on the ground by the time she had her first natural calf at 25 months of age.

Sixteen calves by 25 months

Meanwhile, Humphreys Farm and Ranch continues IVF with a group of 11 elite donor cows, most of which trace back to 286, the original donor. Daughters of 286 include CECC MRP Stockmans Image 1511, a cow Holder calls 101. Like her dam, 101 has been a prolific contributor to the herd's genetic advancement program. Through IVF, 101 had 16 calves on the ground by the time she had her first natural calf at 25 months of age.

“Those matings led to a \$100,000 sale for us before 101 turned three years old,” Holder recalls.

The reproduction program for young donors at Humphreys Farm and Ranch starts with heifers at age 10 to 12 months, about 35 days after breeding. Heifers are aspirated three times over a six-week period and then left alone to deliver a calf naturally. This approach cuts in half the time it takes to determine an individual heifer's future in the herd.

“By starting OPU with young heifers we can get as many offspring as possible in a short period of time and determine whether or not they carry traits we want to keep in the herd,” Holder explains.

Holder maintains a herd of 1,000 recipient females and implants the embryos himself. He synchronizes the recipients' estrous cycles with Lutalyse® three days before the OPU date and implants fresh embryos eight days after OPU. Freezing embryos is also an option.

“The speed and versatility of this IVF process is a huge advantage to our operation,” Holder says. “When I joined Humphreys Farm and Ranch, the owner wanted to do something different with his cow herd and step things up a notch. This system has allowed us to take what was largely a commercial cow operation and build it into a top-notch herd of purebred Herefords that generate high-value calves.”

Different place, same success

Two thousand miles away in Moses Lake, Wash., Mark Ellis also relies on IVF to maximize Hereford genetics. Ellis has built his herd since 1973, when he bought two cows from the former Carnation Farms in Carnation, Wash.

In 1997 Ellis started concentrating the herd into one bloodline founded by WTK 38D Ada 156G, a cow he purchased in Canada, who now has six generations of offspring. Ellis' breeding goals are simple. “I breed cattle that I like,” he says. “I satisfy myself first.”

“I liked the idea of collecting eggs without having to manage a shot schedule.”

— Mark Ellis

Although experienced with IVF as a means of multiplying his herd's genetics, Ellis decided to try the non-FSH process after learning about it at the 2019 National Western Stock Show.

“I liked the idea of collecting eggs without having to manage a shot schedule,” Ellis notes. “We just pick a collection date that works for us and truck the heifers to Hermiston [for OPU].” The process has generated large numbers of high-quality embryos to maximize the offspring from his favorite donor animals.

One favorite cow is EPH 146A Ada E71U, a 2012 Dam of Distinction. She and her daughters have proven to be highly fertile donors. An E71U daughter by H Dimaggio 1094 ET — EPH 7092 Ada E424 — was the first cow on which Ellis used the OPU technology. That initial session with E424 yielded 44 oocytes that ultimately produced 22 embryos.

Although embryos can be frozen, Ellis prefers to implant fresh embryos for higher conception rates. He reports a 75 to 80% pregnancy rate when implanting fresh embryos — even up to 100% in some cases.

“That's a better rate than you get with artificial insemination,” he notes.

Ellis says one of the keys to IVF success is matching implantation with the recipients' estrous cycles, which he achieves using CIDR® devices.

Proper nutrition and mineral supplementation are also important components of his recipient management

program to achieve good pregnancy results. Since Washington is an area deficient in selenium and copper, Ellis gives recipient females a prescription mineral product about 30 days prior to implantation to provide essential minerals to support reproduction.

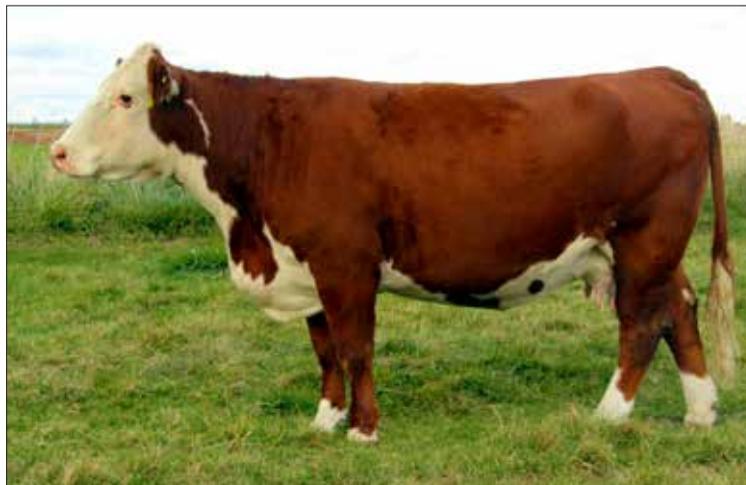
The non-FSH IVF program helps Ellis continue to follow his passion for Hereford cattle — a passion ignited when on a family camping trip to eastern Washington when he was just five years old. A nearby ranch grazed 200 white-faced cattle, which young Ellis, his brother, sister and friend observed taking a “cattle drive” down the creek while exploring on their trip.

“We thought we were on ‘Rawhide,’ a popular TV show at the time,” Ellis recalls. “From then on, I was hooked on Hereford cattle.” **HW**

Editor's Note: This material was provided by Vytelle LLC.

Step-by-step with non-FSH IVF

- 1) Heifer or cow placed into chute or headlock for ovum pickup (OPU)
- 2) Collected oocytes transferred to the laboratory
- 3) Laboratory technician washes, cleans and counts collected oocytes
- 4) Technician fertilizes oocytes with producer's choice of sire(s)
- 5) Fertilized embryos develop for seven days
- 6) Recipient animals prepared for implantation
- 7) Developed embryos implanted into recipient females **HW**



IVF allows Mark Ellis to build on the genetics of EPH 146A Ada E71U, a 2012 Dam of Distinction.