

In vitro fertilization challenges solved

Larger calves should no longer be a concern for breeders.

In vitro is the occurrence of a biological process in a controlled laboratory vessel or experimental setting, rather than in a natural or biological setting (*in vivo*). The science behind the *in vitro* fertilization (IVF) process has existed for decades. In earlier years, it was used primarily for research purposes. In 1981, the first live bovine calf was born as a result of successful IVF technology. Since then, cattle breeders have sought the technology as a complement to traditional embryo transfer work to propagate specific, elite bloodlines within their herds.

In vitro embryo production starts with harvesting oocytes directly from a donor's ovaries through a non-surgical aspiration process. The oocytes are then matured for 24 hours in the laboratory. Next, sperm cells are introduced to the laboratory solution, setting the stage for the actual *in vitro* fertilization. Following this fertilization process, the resulting single-cell embryos are grown or cultured *in vitro* until they reach a stage suitable for transfer.

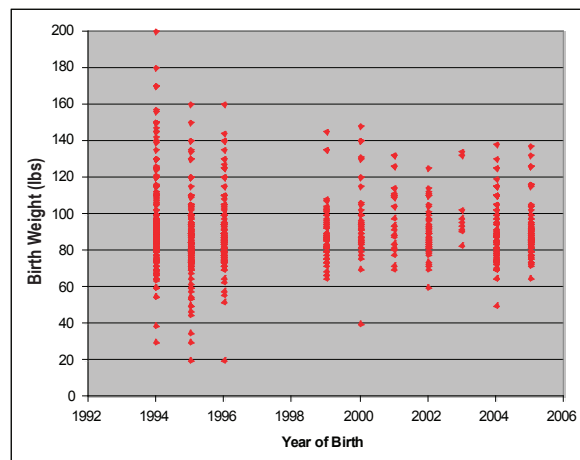
Early on, many cattle breeders who employed the use of IVF complained that the resulting calves being born were larger than average. Problems reported by breeders included increased instances of calving difficulties and thus increased danger and mortality of these valuable calves.

Change in culture media

Backed by over 25 years of advanced cattle reproductive technology experience and leadership in IVF technology, Trans Ova Genetics set out to find a solution to this problem.

Laboratory experts at Trans Ova Genetics, in cooperation with other companies and universities, realized one of the main factors causing the increased occurrence of these larger calves was the presence of serum within the culture media used in the fertilization process.

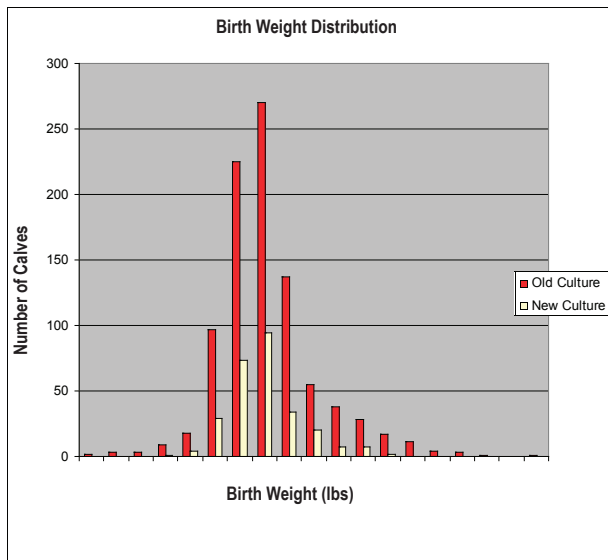
In order to try to correct or minimize the large calf issue for clients, Trans Ova Genetics began to do research with the individual culture components used in their system. Networking with universities and other IVF facilities going through the same issues, Trans Ova Genetics achieved excellent results through this work.



Since changing the culture media 10 years ago, birth weights of calves are more uniform, with fewer very large calves born. The largest calves born in recent years are at least 40 lbs less than the largest calves 13 years ago.

The new culture media discovered through this research has since become the standard for Trans Ova Genetics' IVF process. Subsequently, thousands of live births and calf birth weights have been captured as part of on-going research. For Trans Ova Genetics' clients who chose to take pregnant recipients home for on-farm calving, careful follow-up was performed in order to gather those birth weights as well. All resulting calves were traced back and matched to specific culture media used, including the new media designed to reduce the occurrence of abnormally large calves.

Trans Ova Genetics has accumulated data over a period of approximately 13 years. This data has led to substantial changes to a laboratory system which now has virtually eliminated large calf birth size challenges.



With new, advanced culture media, calves' birth weights are more uniform. The vast majority of birth weights range from 70 lbs to 110 lbs. Forty percent of calves resulting from the old culture required assistance at birth, while only 13 percent of calves resulting from the new culture required assistance.

The new culture helps ensure more calves are born alive (98 percent compared to 89 percent with the previous culture).

Genetics contribute to large calves

Recent statistics from calves resulting from IVF-produced embryos at Trans Ova Genetics show that only 2 percent of calves are born larger than average. And, Trans Ova Genetics experts cite this small percentage to the influence of parental genetics. Cattle breeders must be conscientious of avoiding matings of bloodlines that can increase calf size and calving difficulties caused by genetic influence. Regardless of laboratory processes and procedures, nature still plays a major role in calf size and calving ease.

Trans Ova Genetics also offers breeders the option of health-qualified recipients which can be calved in at Trans Ova Genetics, under supervised care of trained professionals. This helps ensure gestation length is carefully monitored and managed, and that recipients carrying valuable calves do not go over their due dates. And, calves are more likely to be born a normal size, with reduction in the occurrence of calving difficulties. Clients then pick up their calves when the calves are approximately 30 days old.

Concerns of large calves born as a result of IVF technology will probably never be completely eliminated. However, Trans Ova Genetics has helped to ensure that it is greatly reduced for breeders seeking to use *in vitro* fertilization as an advanced reproductive technology to multiply the success of their cattle's genetics.