

IVF: Coming soon to a neighbourhood near you

THE USE OF NEW TECHNOLOGIES has changed the way producers operate over the last two decades. Milking, heat detection, calf feeding and even cow feeding can all look drastically different thanks to the use of new tools. On the veterinary side, other than ultrasound, the industry has not been affected nearly as much by the introduction of new technology. This is likely to change as tools are adapted to work cowside.

ET VS. IVF

Embryo Transfer (ET) and In Vitro Fertilization (IVF) are areas where technology is producing big changes. Traditionally a high worth cow that did not respond to conventional ET could be tried with IVF. ET involves submitting the cow to hormone therapy to increase the number of oocytes that she will produce. When in heat the cow is bred two or three times and seven days later these embryos can be flushed out of the uterus.

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For cows that have a damaged uterus or who's oocytes do not fertilize, normal ET does not work. IVF was invented for these cases.

Instead of waiting for the cow to come into heat, the oocytes are removed via an ultrasound guided needle from the ovaries. The oocytes are then fertilized "in vitro", meaning out of the cow. After growing for seven days, they are ready to implant fresh or can be frozen for later use. IVF does not require the embryo to travel via the uterus, so it can be done twice as often as ET and pregnant animals can also be collected.

This process requires less semen, so sexed semen, which does not work well with ET, provides much better results. It is worth noting that there is no genetic manipulation being applied to the oocytes – they are simply being removed from the cow for seven days for fertilization and growth.

Traditionally used on "problem" cows, IVF is now being applied to any cow or heifer. Breakthroughs in research have increased conception rates and lowered the cost involved in the procedure. Despite this, the animal still had to be shipped to the IVF centre. Here in Ontario, this required a truck ride to Boviteq in Quebec or Trans-Ova in Iowa. The logistics and costs involved were a deterrent for most breeders.

SATELLITES

In 2012 Boviteq started a pilot project called an "OPU satellite" in British Columbia. There they trained an ET veterinarian to collect the ovum (ovum pick up) from the cow or heifer and ship them in a specially designed incubator to Quebec. The oocytes were then fertilized and matured at their main laboratory. This program has been a huge success. Training has been offered to more veterinarians and two satellites are due to open in southwestern Ontario in the coming months.

This model would require the cow to travel to your neighbourhood collection depot, returning home the same day. Embryos are returned fresh or frozen a week later. More satellites are being investigated in Ontario, and Boviteq is expanding their laboratory bases in western Canada and the United States.

Minitube of America is another company expanding

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into Ontario. They currently offer IVF in Wisconsin, but have partnered with a group here to offer outpatient collection and on-site IVF in the near future.

Boviteq also oversees the sex sorting of semen for the Semex Alliance. This gives them the ability to make sexed semen out of frozen doses of any bull for use in IVF, even from another stud. In conventional ET many smaller farms have a backlog of embryo inventory as they don't have enough recipients to implant all the embryos produced. It is also a waste of resources to have recipients carry bulls of low genetic value.

With conventional ET embryos can be biopsied and have their sex determined prior to implantation. This avoids tying up recipients for bulls, but increases costs and male embryos are discarded. Utilization of IVF produces twice as many female embryos and eliminates the cost of carrying bulls.

FOUR TAKE-HOME MESSAGES:

Discretionary income on most dairies is less than in previous decades. Producers are looking for technologies that can improve their results and income over current tools.

- Reduction in costs and improvements in conception rates make IVF an option for all females, not just problem cows
- IVF collections can be performed twice as often as ET, and continued into early pregnancy
- Sexed semen can be used from most bulls, streamlining recipient use and doubling heifer returns
- OPU satellites can reduce trucking and housing costs and stress on donors.