

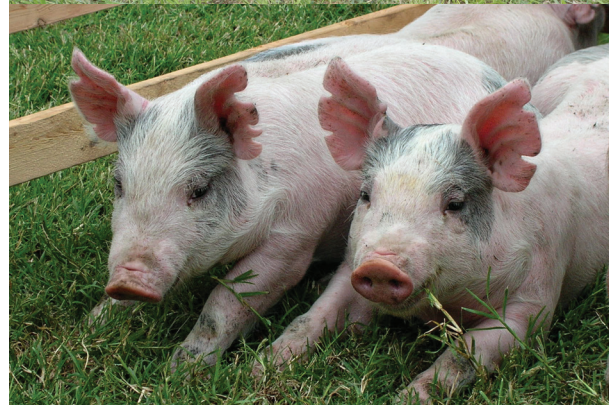
LIVESTOCK CLONING

COMMERCIAL APPLICATIONS

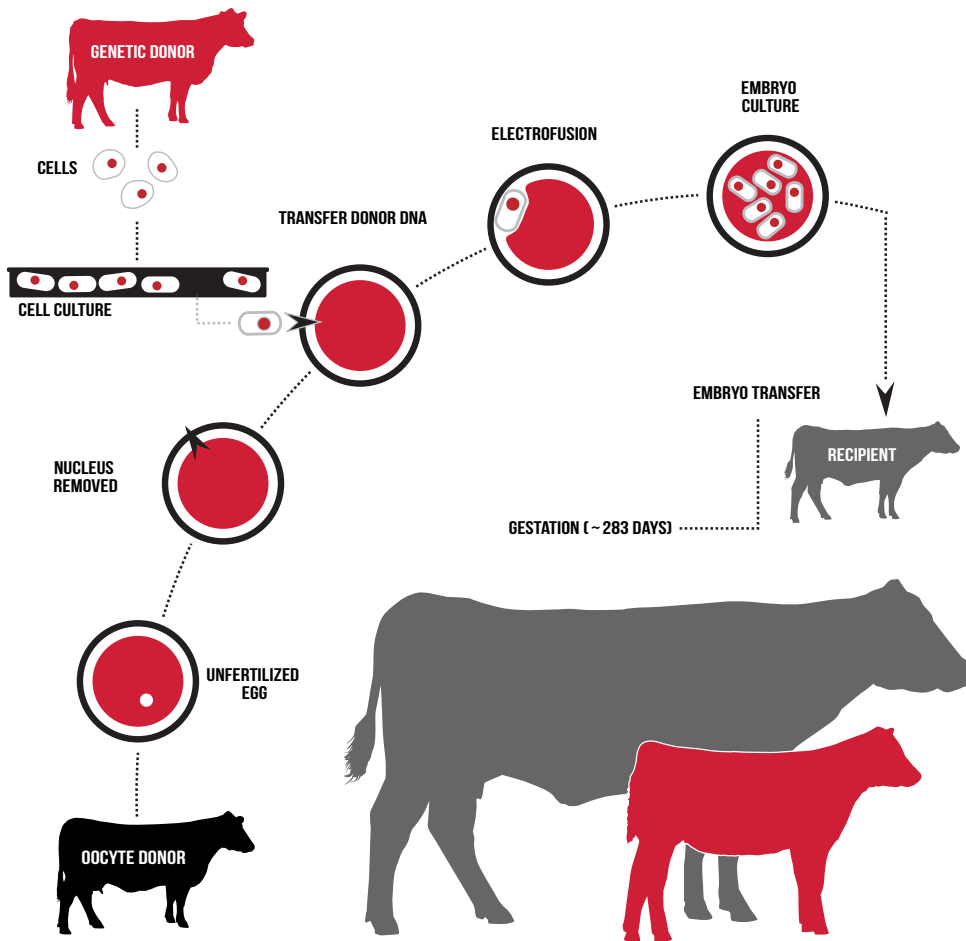
- Through the cloning process, progressive producers can duplicate the animals that contribute the most value in their herds and forward their goals to produce efficient, healthier animals, and better quality food products. The influence of these animals can help create a more consistent supply of tender, flavorful beef, for example.
- Cloning affords breeders the unique opportunity to replace an animal lost early in its breeding career due to death or injury, perhaps even before the value of its genetics were fully discovered.
- Cloning technology can help extend an elite animal's genetic influence and contribution to the improvement of food animal production by increasing embryo or semen production through multiple cloned animals with the same genetics.
- Using cloning technology, breeders with superior castrated males (steers, geldings, barrows and wethers) can produce an intact cloned male, for breeding purposes, adding genotypes to the genetic pool that would have previously been lost.
- Genetic Preservation followed by cloning is an excellent form of insurance for any species. It allows the animals that are irreplaceable.....to be replaceable.

THE FACTS

- Cloning is simply another assisted reproductive technology (ART) that can be utilized by progressive livestock breeders. Other ART includes artificial insemination, embryo transfer, in vitro fertilization and sexed semen.
- Cloning allows livestock breeders to create a genetic copy of an existing animal -- essentially an identical twin.
- Animal clones are not "biotech" or "genetically engineered" animals.
- Offspring will be bred through other conventional breeding techniques, and are not clones themselves.
- In January 2008, the U.S. Food and Drug Administration (FDA) published a risk assessment that concluded that the meat and milk products from cloned animals and their offspring is safe for human consumption and it is not any different from foods produced through other breeding methods. Under current FDA labeling guidelines, food products from animal clones will not require special labeling.
- Animal clones will primarily be used as breeding stock to improve the health and quality of animals used for food production. Most consumers will likely never eat an animal clone; rather, meat and milk products in the marketplace will come from the offspring of animal clones.



CLONING PROCESS



1. Unfertilized oocytes are sourced from oocyte donors, and enucleated (nuclear material is removed)
2. Cells from the genetic donor are transferred into the enucleated oocytes to form a reconstructed oocyte
3. Electrical current is passed through media containing the oocytes to fuse the outer membrane of the donor cell to the inner nuclear membrane of the enucleated oocyte (electrofusion), to form fused couplets
4. The fused couplets incubate for a few days to form early stage embryos
5. Resulting embryos are transferred into recipients
6. Genetic twin is born after a normal gestation period

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