CLONING FACT SHEET

WHAT IS CLONING?

Cloning creates a genetic "twin" of another animal. A cloned animal has the same DNA as its parent, much like identical twins share the same DNA.

Many types of animals have been cloned in the past 20 years. The process involves transferring genes from one animal to the egg of another, then implanting the embryo in a host female for conventional development and birth.

THE CLONING PROCESS

To clone an animal, such as a cow, scientists use a process called "somatic cell nuclear transfer" (SCNT).

- **Step 1:** Scientists remove the genes from a cell of an adult "donor" cow.
- **Step 2:** Scientists remove the genes from the egg of a different cow.
- **Step 3:** The genes from the donor cow are put into the egg cell.
- **Step 4:** The egg begins to divide, becoming an embryo.
- **Step 5:** The embryo is then transferred to a "surrogate" cow where it will grow and develop, resulting in the conventional birth of a genetic twin of the "donor" cow.

WHY WOULD A FARMER USE THIS TECHNIQUE?

Cloning is an option that few farmers and ranchers might choose to use to breed top quality animals.

Improving the genetics of a dairy or cattle herd is not new to farmers. Dairy farmers and cattle ranchers have been using safe and proven methods to breed the best possible livestock for centuries. Many scientific improvements in the past few decades have allowed for the increased use of some of these practices, which include selective breeding, artificial insemination and embryo transfer.

Cloning is a niche-market technology, and it remains to be seen whether dairy farmers will choose to use it. There are currently very few cloned dairy cows in this country – only about 150 cows out of the 9 million total U.S. dairy cows – and many of these are "show" animals.

ARE THERE SAFETY CONCERNS?

The Food and Drug Administration (FDA) and the National Academy of Sciences (NAS) support the conclusion that milk from cloned cows is no different than milk from conventionally bred cows.

A worldwide body of evidence supports the conclusion that food derived from cloned animals does not pose any food safety risks. In addition, several studies that specifically compare cloned and conventionally bred cows underscore the safety of milk from cloned cows.[1]

Nothing is more important to dairy farmers and milk processors than the trust people have in milk and milk products. In order to maintain that trust, we support efforts to register and track animal clones and will proceed carefully to ensure that any milk that is introduced into the marketplace is handled in accordance with this system.

HELPFUL LINKS:

- www.fda.gov/cvm/cloning.htm

- www.dairyfarmingtoday.org
- http://learn.genetics.utah.edu/units/cloning/clickandclone/
- www.clonesafety.org/

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[1] Aoki S, Takahashi R, Nisisouzu T, Kitamura S, Dochi O, Kishi M, et al. 2003. A comparative investigation of the characteristics of Holstein cows cloned from colostrum-derived mammary grand epithelial cells in an automatic milking system. Theriogenology 59:234. (abstract)

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