

Frequently Asked Questions

Animal Cloning

What is animal cloning?

Cloning is an assisted reproductive technology that allows livestock breeders to create identical twins of their best animals. This breeding technique does not change the genetic makeup of the animal. The most common procedure used today is known as somatic cell nuclear transfer (SCNT), which makes it possible to produce many animals from a single donor. SCNT involves transferring the genetic information from one animal into an empty oocyte, or egg. This process results in an embryo, which is implanted into a surrogate mother who carries the pregnancy to term.

How does cloning affect the DNA of animals?

Cloning does not change DNA, and clones are not genetically engineered animals. It is simply assisted reproduction, similar to embryo transfer, artificial insemination, or *in vitro* fertilization.

Is animal cloning a new technology?

Animal cloning has been rigorously studied for decades, since the earliest research on embryo splitting in the late seventies and early eighties. The U.S. Food and Drug Administration has analyzed numerous scientific studies on the subject, conducted over 30 years and encompassing several generations and large families of livestock.

Cloning and Animal Health

Does cloning cause animal suffering?

Cloning enhances animal wellbeing, and is no more invasive than other accepted forms of assisted reproduction such as *in vitro* fertilization. In fact, clones are the “rock stars” of the barnyard, and therefore are treated like royalty. Breeding the best possible stock improves the over-all health and disease resistance of animal populations. Additionally, because these breeding techniques can improve the over-all health and disease resistance of an animal, cloning will greatly reduce animal suffering.

Are animal clones healthy?

Decades of research has shown that cloned animals are as healthy as conventional animals. A National Academy of Sciences (NAS) review found “the health and well being of somatic cell clones approximated those of normal individuals as they advance into the juvenile stage. Somatic cell cloned cattle reportedly were physiologically, immunologically, and behaviorally normal.”

How does the neonatal mortality rate of animal clones compare to other animals?

Any animal conceived through any assisted reproductive technique — AI, embryo transfer, *etc.* — has a slightly higher risk of neonatal death. In the hands of skilled scientists, the neonatal death rate of cloned animals approaches that of animals produced by *in vitro* fertilization. Within hours or days of birth, there are no health differences between clones and non-clones, according to an NAS review panel. A common misconception is that clones suffer a higher deformity rate than other animals. Only the placentas of clones show any difference from animals born conventionally. In fact, these placental problems occur at similar rates in other assisted breeding techniques, such as *in vitro* fertilization and embryo transfer. Scientists are working to reduce the impact of placental effects on embryo implantation for a successful pregnancy.

Don't clones suffer a higher rate of deformities than other animals?

No. Only placentas of clones show any difference from animals born the conventional way. However, these placental problems occur at similar rates in fetuses produced through other assisted breeding techniques, such as *in vitro* fertilization and embryo transfer.

Is there a risk of Large Offspring Syndrome (LOS) among animal clones?

LOS occurs naturally in cattle. It is seen at higher rates with any assisted reproductive technologies and is not a problem caused specifically by cloning.

Are embryos lost while creating clones?

Embryos are lost in any form of reproduction — including sexual reproduction. In the hands of skilled practitioners, cloning success rates approach other forms of assisted reproduction.

How has the cloning process evolved since Dolly's birth?

Every step of the cloning procedure has improved in the decade since Dolly's birth. Continuing improvements have reduced health problems seen in early reports to rates approaching those of other reproductive technologies.

Did cloning affect Dolly's health and lead to her premature death?

Dolly died of cancer resulting from viral pneumonia. This disease outbreak killed many other sheep the same year she died and affected many animals housed in the same barn. Although it was widely reported in the press that Dolly suffered from arthritis and may have aged prematurely, there is no evidence in the scientific literature that this was true for Dolly or other clones.

Is cloning ethical?

While it is up to each individual to determine their viewpoint on different technologies, the major world religions do not have an issue with livestock cloning. The Catholic Church, in its "Reflections on Cloning,"¹ says "there is a place for research, including cloning, in the vegetable

¹ *Reflections on Cloning*, Pontificia Academia Pro Vita, 1997, http://www.vatican.va/roman_curia/pontifical_academies/acdlife/documents/rc_pa_acdlife_doc_30091997_clon_en.html.

and animal kingdoms.” On the whole, leading Muslim and Jewish thinkers also agree that cloning is acceptable to meet standards of kosher and halal.²

Animal Clones and Their Food Products

Is it safe to use clones in the food supply?

After analyzing more than 400 scientific studies, the U.S. Food and Drug Administration (FDA) and the National Academy of Science (NAS) both separately concluded that meat and milk products from animal clones and their offspring are as safe as foods from conventionally bred animals. The NAS studies also concluded that consumers would actually receive better food from cloning technology because animal clones have “increased genetic merit for increased food production, disease resistance and reproductive efficiency.”

Will we eat animal clones?

Cloning will be used primarily for breeding purposes. These animals are very costly and will represent the most valuable breeding stock; consumers are unlikely to eat an animal clone. They will eat food from animals that are the offspring of clones, which are conventionally bred and are not clones themselves.

Are milk and meat products from animal clones currently in the marketplace?

In January 2008, the U.S. Food and Drug Administration published a final risk assessment on meat and milk products from animal clones and their offspring which concluded that these products are as safe as conventionally produced food products.

Currently, there are no known meat and milk products from cloned animals and their offspring in the marketplace. Additionally, since most consumers will purchase food products from the offspring of animal clones, with FDA’s safety conclusion now in place, cloned animals produced to date are unlikely to enter the food supply for another three to five years.

Will milk and meat products from animal clones and their offspring be labeled?

The Food and Drug Administration’s labeling policy requires that foods only be labeled if there have been significant changes in its nutritional composition, or if there are any changes in other health-related characteristics, such as allergenicity, toxicity or composition. Based on scientific studies, because the milk and meat products from cloned animals and their progeny are nutritionally equivalent to their conventional counterparts, they would not be required to be labeled.

What if I don’t want to eat food products from animal clones?

Animal clones will primarily be used as breeding stock to improve the health and quality of animals used for food production. So, most consumers will likely never eat a meat or dairy

² “Religion a Prominent Cloned-Food Issue,” *The Washington Post*, 2006, <http://pqasb.pqarchiver.com/washingtonpost/access/1147972861.html?dids=1147972861:1147972861&FMT=ABS&FMTS=ABS:FT&date=Oct+19%2C+2006&author=Rick+Weiss+-+Washington+Post+Staff+Writer&pub=The+Washington+Post&edition=&startpage=A.9&desc=Religion+a+Prominent+Cloned-Food+Issue>.

products from an animal clone; rather, meat and milk products in the marketplace will come from the offspring of animal clones. These offspring would be bred through other conventional breeding techniques and not be clones themselves. However, to address consumer, livestock producer and meat and milk processor requests for “clone-free” products, in December 2007, the major animal cloning technology providers introduced an animal clone tracking system that identifies animal clones as they move into the food processing system over time. This tracking system is the only way to help ensure “clone-free” marketing claims.

How will cloned animals benefit consumers?

Cloning can be used to breed livestock with leaner or higher grade meats. This means more nutritious and tasty food for consumers. Also, by breeding the healthiest and strongest animals, the overall health of the whole herd is healthier and stronger. Healthier animals means better food. Because cloning can be used to increase the overall health of the herd, use of this technology could lead to reduced use of antibiotics or other animal drugs. Cloning can also help breed livestock that are immune to diseases like bovine spongiform encephalopathy (BSE) frequently referred to as “mad cow” disease.

How has the public’s perception of cloning changed over the years?

A recent poll conducted by the International Food Information Council (IFIC) shows that over the last two years, consumers have become increasingly likely to buy meat, milk, and eggs from cloned animals. Those saying they would be likely to purchase products from cloned animals increased 12 percentage points, from 34 percent in 2005 to 46 percent today. Learning that animal biotechnology can improve the quality and safety of food (animal health, improved nutrition) had a positive effect on two-thirds of consumers (66 percent).

Will food products from cloned animals and their progeny be regulated for food safety, similar to conventional foods?

More than 10 federal laws ensure public health and safety for all milk and meat products – whether they are from conventional animals or cloned animals and their progeny. These include the federal Food, Drug & Cosmetic Act, Animal Health Protection Act, the Animal Damage Control Act and the National Environmental Protection Act. Overseeing these laws are three federal agencies: the U.S. Food and Drug Administration, the U.S. Department of Agriculture, and the U.S. Environmental Protection Agency.

For More Information

To access more information about animal cloning, please feel free to visit the following resources:

Biotechnology Industry Organization (BIO) • www.bio.org • 202.962.9200

CloneSafety.org • www.clonesafety.org

Food and Drug Administration, Center for Veterinary Medicine • www.fda.gov/cvm

Animal Cloning: A Draft Risk Assessment, 2003 •
www.fda.gov/cvm/Documents/CLRAES.pdf

National Academies of Science

Animal Biotechnology: Science-Based Concern, 2002 •
www.nap.edu/books/0309084393/html/

Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects, 2003 • <http://newton.nap.edu/catalog/10977.html#toc>