CLONING

What is Cloning?
Cloning is a scientific process that allows scientists to copy the genetic traits of a plant or animal to create one or more living replicas. In 1996, Scottish scientists successfully created the first mammal ever cloned from an adult cell—a sheep, which they named "Dolly." This followed the 1995 cloning of two sheep from embryonic cells. Cloning is a highly controversial topic.

HOW DOES CLONING WORK?

Scientists clone animals by destroying the nucleus of an unfertilized egg in the host animal and replacing it with a nucleus from a cell of the body from another animal. At this point, the egg of the host animal is considered fertilized and is planted into its womb. The baby that develops will have the identical genetic traits as the animal that provided the nucleus used to fertilize the host's egg.

DESIGNER MEAT FOR DINNER?

Over the past decade, mice, mules, horses, deer, oxen, cows, pigs, dogs and cats have all been cloned. With the advancement in cloning technology, particularly in farm animals, the potential for its use in industrial meat and dairy production has become a real concern for consumers. Scientists expect that in the future, cloning technology will be commonly used for replicating breeding animals. This would allow the meat and dairy industries to take advantage of the genetic traits of prized cows and bulls without being limited by the animal's natural life span.

CLONES WILL MOST LIKELY NOT BE RAISED TO BE SLAUGHTERED FOR MEAT, BUT INSTEAD WILL PRODUCE OFFSPRING TO BE USED FOR FOOD PRODUCTION.

Cloning, however, is a very expensive process, so the clones will most likely not be raised to be slaughtered for meat, but instead will produce offspring to be used for food production. Because cloning can duplicate dairy cows that produce more milk than others in the herd, there is a strong interest in developing herds of clones to produce milk for the general food supply. Semen from cloned bulls is already shipped to breeding programs all over the country. Research is also in the works to try to produce hogs with increased levels of omega-3 fatty acids. This is done by incorporating a gene from earthworms into the genetic material of pigs, and is still very much in the experimental phase. Eventually, scientists hope to increase the nutritional value of chicken and beef cattle using a similar process.

IS IT SAFE?

In early 2008, the Food and Drug Administration (FDA) announced that, despite significant controversy and many unanswered questions, meat and milk from cloned animals is safe to eat. The agency did ask that the livestock and dairy industries uphold a 2003 voluntary ban on the use of cloned animals in any phase of food production. However, no such ban is in place for the offspring of cloned animals, and foods containing meat or dairy from cloned animals or their offspring are not required to be labeled. In short, it is very likely that meat from the offspring of cloned animals is in the general food supply at this very moment.

ARE CLONES EXACTLY THE SAME?

Despite claims that food from clones is safe, many believe that there has not yet been an adequate amount of research conducted to prove that this is true. What is clear is that many scientists believe cloning produces animals that are more likely to become sick than animals that are born

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naturally, resulting in an increased use of antibiotics and other medical interventions. Dolly the sheep, for example, developed premature arthritis and lung disease that led her creators to euthanize her after just six years – roughly half the lifespan of a normal sheep.

Dolly's creator, Ian Wilmut, has said that small imbalances in a clone's protein, hormone, or fat levels could affect the safety and quality of its milk or meat.

HOW DOES CLONING IMPACT THE ANIMALS?

Some believe that the cloning of animals is a violation of animal welfare, as it puts both the sick and deformed clones and their surrogate parents through unneeded suffering. Cloned animals tend to have more problems during gestation and birth, resulting in higher rates of miscarriage and death among host mothers. Researchers have noted severe physical deformities in cloned animals, including oversized navels, oddly-shaped heads (cows that have heads shaped like those of bulldogs), immune deficiencies, diabetes, heart and lung damage, kidney failure, brain irregularities, and malformed arteries. In fact, 2007 data showed that cloning success rates are as low as 10%.

Furthermore, if a cloned animal survives birth and the first six months of its life, the FDA maintains that the animal is healthy. However, significant health problems in cloned mice have first manifested at up to 15 months. In cattle or other large animals, such long-term health problems could take years to discover.

In short, the long-term human and animal health impacts of breeding programs based on clones remain unknown.

DID YOU KNOW?

- It costs about $20,000 to clone a cow.
- Scientists have managed to clone 15 kinds of mammals to date, none of which have been primates.
- A Texas-based company began cloning champion horses in March 2006 that can sell for as much as $150,000 per horse.
- House cats can be cloned privately for $32,000.

What You Can Do...

The use of cloning technology in livestock production is not illegal. Therefore, there is a good chance that there are already beef and dairy products on the market that came from the offspring of cloned cattle. If you want to be absolutely sure that you and your family are not eating meat and dairy from cloned animals, purchase your food from small, local farms run by farmers you trust and ask them about their animals' origins.

To find sustainably raised meat near you visit www.eatwellguide.org.

Find more detailed information about cloning on our website at **www.sustainabletable.org/issues/cloning**.