



# Cloned Animals — 2010 Update

Fact Sheet • September 2010

In early 2008, the Food and Drug Administration (FDA) announced that it considered meat and milk from cloned animals to be safe to eat<sup>1</sup> despite years of controversy and a long list of unresolved ethical, health and animal welfare concerns. In concert with the United States Department of Agriculture (USDA), regulators asked the livestock industry to continue a voluntary moratorium on allowing meat and milk from cloned animals into the food supply. As early as January 2008, the USDA identified potential concerns about clones entering “export channels,” saying, “industry will implement its livestock cloning supply chain management program which will establish protocols for tracking animal clones” — although this does not appear to yet be in place.<sup>2</sup> Equally disconcerting, animal products derived from clones have no labeling requirements, depriving consumers of their right to choose or the ability to avoid cloned products if they are concerned about this technology.



Currently, cloned animals appeal to the livestock industry largely in their role as breeders or milk producers. Already, cloned bulls’ sperm and frozen embryos are shipped all over the country and exported to sire offspring with particularly desirable traits, such as high milk production. There may be as many as 5,500 cloned animals worldwide, including 4,000 cattle and 1,500 pigs.<sup>3</sup> An estimated 650 cloned animals are in the United States<sup>4</sup> and have likely sired countless cows and pigs used in commercial animal agriculture.

And animal products from the offspring of cloned animals have almost certainly graced the plates of unknowing consumers in the United States and elsewhere,<sup>5</sup> likely many thousands of times.<sup>6</sup> Discovery of meat products from clone offspring in the United Kingdom in 2010 set off a national uproar in Britain and renewed discussion about how, or even if, food from clones should be regulated throughout the EU.<sup>7</sup> The incident came hard on the heels of a July EU Parliamentary vote calling for a complete ban on food from clones and their offspring and for an interim moratorium until legislation for a ban could be enacted.<sup>8</sup>

That incident awakened consumer concerns internationally, forcing U.S. Secretary of Agriculture Tom Vilsack to respond to Canadian concerns that cloned animal products had entered the North American food supply.<sup>9</sup> Vilsack, saying he didn’t know if cloned animals or their offspring were in the marketplace, noted that

current scientific literature on the safety of these products “suggested” they are safe<sup>10</sup> — not exactly the vote of confidence that consumers look for from the nation’s top agriculture official. Such statements also cast doubt on previous USDA and FDA conclusions that meat and milk from clones “are safe to eat.”<sup>11</sup> The USDA, like the FDA before it, allows offspring of cloned animals into the market place, though the agency has asked industry to follow a voluntary moratorium against putting actual clones into the food supply.<sup>12</sup> Neither the FDA nor the USDA is tracking cloned animals to know if, when or where they are entering the food supply. The UK Food Standards Agency say they have no idea how many offspring from clones there are on British farms.<sup>13</sup>

Even as the FDA offered its approval of cloned food animals for human consumption, there remain concerns about the impact on animal health and the insufficient research on the safety of eating meat or drinking milk from cloned animals. U.S. and EU authorities repeat the assertion that, “Meat and milk from animal clones and their offspring are no different from products from conventionally bred animals. Scientists can’t tell the difference.”<sup>14</sup> But in reality, scientists have done very little research on this subject,<sup>15</sup> and a lack of evidence should not substantiate a scientific conclusion, especially one as far-reaching as the FDA’s. Additionally, some preliminary research has already produced evidence pointing to differences in meat composition between cloned animals and normal animals, warranting further review.<sup>16</sup>

## Animal Welfare

Cloning animals, by everyone’s admission, is an inexact science. Studies of cloned animals detail very low survival rates — far less than 5 percent — and most cloned embryos die in the uterus or shortly after birth.<sup>17</sup> This matter drew the attention of the European Group of Ethics (EGE), which opined, “Considering the current level of suffering and health problems of surrogate dams and animal clones, the EGE has doubts as to whether cloning animals for food supply is ethically justified.”<sup>18</sup>

And the ones that do survive, like the famous cloned sheep, Dolly, can experience premature health problems. Dolly died at the age of 6 years old from major medical complications, including arthritis — far younger than a normal sheep.<sup>19</sup> Ten years after Dolly, the cloning technology has improved very little,<sup>20</sup> with successful offspring rates still ranging from 1 to 5 percent.<sup>21</sup>

In a 2009 attempt to save an extinct animal, the ibex, scientists implanted 57 clone embryos into female goats. This resulted in only seven pregnancies and one kid, which died within seven minutes of leaving the womb. This follows a previous attempt, which also failed.<sup>22</sup>

“I believe a normal clone has yet to be made,” stated Rudolf Jaenisch, professor of biology at the Massachusetts Institute of Technology. “You can’t tell me that 95 percent die before birth and the other 5 percent are normal.”<sup>23</sup>

Cloned sheep, cows and mice have been born with malformed brains, livers, spleens, lymph nodes and urogenital tracts.<sup>24</sup> Internal hemorrhaging, digestive problems, hydrocephalus and multiple organ failure are some of the most common causes of death among cloned animals in



the first week of life.<sup>25</sup> A 2005 USDA study revealed that cloned pigs had weakened immune systems compared with normal pigs.<sup>26</sup> A leader of the USDA study, Jeff Carroll, noted, “I’ve looked at the immune response of hundreds of young pigs and I’ve never seen anything that low until I looked at a clone.”<sup>27</sup>

The National Academies of Sciences (NAS) noted that cloned animals often experience complicated births which harm the surrogate animals. The report also noted that some clones have health problems like heart and lung disease and other developmental problems, while some cloned mice have behavioral abnormalities.<sup>28</sup> Despite the many cautionary points about the science of cloning and safety of meat products from the cloned animals found in the NAS report, the FDA used the report as justification for their safety.<sup>29</sup> Independent scientists and consumer groups skewered the FDA for its short-sighted risk analysis that allowed cloned animals into commercial agriculture, and several pieces of legislation have called for a fresh review of the science and labeling requirements.<sup>30</sup>

One major cause of clones’ health problems is “epigenetic effects,” which can cause clones to be different than the original animal. Even though the DNA is the same among these animals, they can still look and develop differently because certain genes may be turned “on” or “off” in the cloned animal relative to its predecessor. These epigenetic effects can be created by the process of cloning the animal, environmental conditions (like pollution) and other factors. Epigenetic effects are also the reason that identical twins may look slightly different and have unique fingerprints. Therefore, even if clones may seem to be healthy, they may have epigenetic defects that cause problems when certain genes are activated years later in their lives.<sup>31</sup> For example, cloned dairy cows have developed chronic lameness, revealing an inherent weakness. In fact, the most common form of death for cloned cows that survive weaning is from euthanasia after suffering from a musculoskeletal abnormality.<sup>32</sup>

## Consuming Cloned Meat and Milk

There is little information on the effects of eating meat or drinking milk from cloned animals or their offspring. The NAS found that food from clones is “not likely” to pose health problems, and found “no evidence [that] cloned animals are unsafe to eat, but data [is] still lacking.”<sup>33</sup> A lack of evidence of harm is not an adequate substitute for an assessment of the safety of food products derived from

cloned animals, though that is the course the FDA and USDA are taking.

To date, there are only a few scientific studies that compare the meat and milk products from cloned and non-cloned animals. The studies have not found definitive, significant differences in the composition of the meat and milk products, but have indicated some differences that merit further scientific review.

In one study, the cloned cattle did have significantly higher levels of some fats than the non-cloned animals, and there were four other areas, largely regarding muscle composition, in which clones differed from the comparison groups.<sup>34</sup> Another study found differences in the mineral and fatty acid content of milk from cloned versus non-cloned cows.<sup>35</sup> A 2003 report commissioned by Japan's Ministry of Health, Labor and Welfare recommends caution: "Since cloning technology is new, prudent consideration is necessary on declaration of the safety of food from cloned cattle."<sup>36</sup>

In sum, a 2004 NAS report states, "Since there is no evidence that food from cloned animals poses any increased health risk to the consumer, it could be concluded that food from cloned animals should be approved for consumption. However, the paucity of evidence in the literature on this topic makes it impossible to provide scientific evidence to support this position."<sup>37</sup>

## Consumer Attitudes

One aspect of the cloning issue that is clear is that people do not want to eat cloned animals. In Europe, nearly 85 percent of consumers say that scientists don't know enough about the long-term health and safety effects of using cloned animals for food, and the majority of Europeans disagreed that consumers would benefit from having cloned animals in the food supply.<sup>38</sup> In the United States, a 2008 poll found that 69 percent of consumers expressed concern over eating animal products derived from clones, and 89 percent of consumers would want milk and meat products derived from cloned animals to be labeled.<sup>39</sup> In a recent industry survey, 62 percent of consumers said they would be "very unlikely" or "somewhat unlikely" to buy animal products from cloned animals.<sup>40</sup>

Beyond health concerns, consumers question the ethical and moral grounds of cloning animals. More than 60 percent of Europeans say cloning animals is morally wrong and they believe cloning would decrease genetic diversity in livestock populations.<sup>41</sup>

In 2005, the International Dairy Foods Association was so concerned with potential consumer backlash that they asked the FDA to keep cloned animals out of animal agriculture.<sup>42</sup>

In light of the public response that followed recent news of meat from cloned animals entering the food supply in Europe and in North America, there is a clear and present need for tighter regulation of cloned animals and their offspring. Consumers deserve the right to know whether their milk and meat products come from cloned animals or their offspring, and regulators should institute a labeling requirement and a tracking and tracing program to help facilitate this as well as to help importers

track clones and their offspring. Additionally, regulators should facilitate public discussions about the ethical issues surrounding cloning and animal agriculture because there is such widespread opposition to this technology.

The investigation by the UK Food Standards Agency (FSA) after the disclosure that food from clones had illegally entered the food chain raised as many questions as it answered. The FSA found no milk from affected animals entered the food chain, but at the time of this writing had not explained the claims by a UK dairy farmer in the U.S. press that he was selling his milk from a clone as food.<sup>43</sup> Livestock producer Steven Innes, who put beef from cloned offspring into the marketplace, maintains that regulators were aware of his operation but never instructed him to treat these animals any differently.<sup>44</sup> Additionally, the UK Government says no advice was given to any clone importers on bringing products from clones to market as food.<sup>45</sup> In light of these discrepancies, campaigners are now calling on the UK Government to urgently introduce an interim UK regulation to prohibit the import of cloned embryos, animals and semen and to require all animal health and identity papers to clearly state if the animal is a clone or clone offspring.

## Who Is Pushing Cloned Animals?

The public polls make clear that consumers do not want meat or milk from cloned animals. So who does? Obviously, the biotech companies that develop cloning technology would benefit financially from its widespread use. But are farmers clamoring for cloned animals? It's less likely that small-scale farmers could benefit from — or even afford — cloning technology. One of the UK farms involved in the recent crisis has since gone out of business, demonstrating that reliance on techno-fixes will not mend what is wrong with our farming system.<sup>46</sup> The most likely beneficiaries would be large-scale agribusinesses, which could use the technology to further industrialize animal production by increasing production from individual animals and linking cloning technology to other technologies such as genetically engineered animals.

Addressing how the U.S. approach to cloning has affected EU food supplies is, like genetically modified food



before it, a potential political minefield, but must be tackled. European regulators must stand firm and apply all appropriate precaution-based checks on untested foods. International trade agreements may be called upon as reasons this “cannot” be done, but the safety of our food and public confidence in our regulatory systems is far too important to trade away.

## Take Action!

Write to your MEPs and congratulate them on the Parliament’s vote to ban clones and ask them to continue to pressure the Commission to bring forward the required legislation urgently, as well as a moratorium in the meantime, not just for food production from clones but also from clone offspring.

## Endnotes

- FDA. “FDA Issues Documents on the Safety of Food from Animal Clones.” January 15, 2008. Available at [www.fda.gov/bbs/topics/NEWS/2008/NEW01776.html](http://www.fda.gov/bbs/topics/NEWS/2008/NEW01776.html) and on file. Accessed August 16, 2010.
- United States Department of Agriculture. Questions and Answers, FDA’s Final Risk Assessment, Management Plan and Industry Guidance on Animal Clones and their Progeny.” January 2008. Available at <http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2008/01/0011.xml> and on file. Accessed August 23, 2010.
- European Food Safety Authority. “DRAFT Scientific Opinion on Food Safety, Animal Health and Welfare and Environmental Impact of Animals1 derived from Cloning by Somatic Cell Nucleus Transfer (SCNT) and their Offspring and Products Obtained from those Animals; DRAFT Scientific Opinion of the Scientific Committee.” December 19, 2007. Available at [http://www.efsa.europa.eu/EFSA/DocumentSet/sc\\_opinion\\_clon\\_public\\_consultation.pdf](http://www.efsa.europa.eu/EFSA/DocumentSet/sc_opinion_clon_public_consultation.pdf) and on file. Accessed August 13, 2010.
- Roosevelt, Margot. “Would You Eat a Clone?” Time. June 13, 2005.
- Zhang, Jane and Julie Jargon. “Food companies pledge not to use Clones.” Wall Street Journal. September 8, 2008.
- Cowan, Tadlock and Geoffrey Becker. “Biotechnology in Animal Agriculture: Status and Current Issues.” Congressional Research Service. January 29, 2010 at 11.
- Gabbat, Adam et al. “Amount of clone-derived meat in the UK ‘unknown.’” The Guardian. August 4, 2010.
- European Parliament. “MEPs call for ban on food from cloned animals.” Plenary Session, July 5-8, Headlines. Available at [http://www.europarl.europa.eu/news/public/focus\\_page/008-76988-176-06-26-901-20100625FCS76850-25-06-2010-2010/default\\_p001c009\\_en.htm](http://www.europarl.europa.eu/news/public/focus_page/008-76988-176-06-26-901-20100625FCS76850-25-06-2010-2010/default_p001c009_en.htm) and on file. Accessed August 23, 2010.
- Schmidt, Sarah. “Meat from cloned cows could have entered North American food supply.” National Post. August 10, 2010.
- Schmidt, Sarah. “Meat from cloned cows could have entered North American food supply.” National Post. August 10, 2010.
- United States Department of Agriculture. Questions and Answers, FDA’s Final Risk Assessment, Management Plan and Industry Guidance on Animal Clones and their Progeny.” January 2008. Available at <http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2008/01/0011.xml> and on file. Accessed August 23, 2010.
- Cowan, Tadlock and Geoffrey Becker. “Biotechnology in Animal Agriculture: Status and Current Issues.” Congressional Research Service. January 29, 2010 at Summary.
- Poulter, Sean and Sarah Bruce. “As big supermarkets vow NEVER to sell clone meat or milk, the Mail tracks down the farmers with 96 more clone cows.” Daily Mail. August 5, 2010.
- See Bruce I. Knight, *Under Secretary for Marketing and Regulatory Programs*, speaking at *Argentina Workshop on Cloning, Buenos Aires, December 9, 2008*. Available at [http://www.aphis.usda.gov/newsroom/speeches/content/2008/12/cloning\\_moving\\_forward\\_together.shtml](http://www.aphis.usda.gov/newsroom/speeches/content/2008/12/cloning_moving_forward_together.shtml)
- Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects. National Academy of Sciences. 2004.
- Tian, Cindy et al. “Meat and milk compositions of bovine clones.” Proceedings of the National Academies of Science. May 3, 2005.; 102(18): 6261–6266. AND “Heyman, Y. et al. Assessing the quality of products from cloned cattle: An integrative approach.” *Theriogenology*. January 1, 2007 at Abstract.
- Tamada H, Kikyo N. “Nuclear reprogramming in mammalian somatic cell nuclear cloning.” *Cytogenetic and Genome Research*, 2004. 105:285-291.
- European Group on Ethics. “European Group on Ethics adopts its opinion nr. 23 on ethical aspects of animal cloning for food supply.” January 16, 2008. Available at [http://ec.europa.eu/european\\_group\\_ethics/activities/docs/press\\_release\\_opinion23\\_en.pdf](http://ec.europa.eu/european_group_ethics/activities/docs/press_release_opinion23_en.pdf) and on file. Accessed August 23, 2010.
- Kanter, James. “Scientists produce first cloned fighting bull.” New York Times. July 29, 2010.
- Loi, Pasqualino et al. “Epigenetic Mechanisms in Mammals and their effects on cloning procedures.” *Lost Sex: The Evolutionary Biology of Parthenogenesis*. 2009 at Chapter 26, Page 568.
- Loi, Pasqualino et al. “Epigenetic Mechanisms in Mammals and their effects on cloning procedures.” *Lost Sex: The Evolutionary Biology of Parthenogenesis*. 2009 at Chapter 26, Page 561.
- Connor, Steve. “Cloned goat dies after attempt to bring species back from extinction.” The Independent. February 2, 2009.
- “Even The Few That Make It Are Abnormal.” *BIO WORLD Today*. October 14 2005.
- Vatja, G. Handmade Cloning—Summary. Unpublished. 2004. As cited in: “The Science and Technology of Farm Animal Cloning: A review of the state of the art of the science, the technology, the problems and the possibilities.” Report from the project Cloning in Public. Danish Centre or Bioethics and Risk Assessment. ; Renard J.P., Chastant S., Chesne C.R., Marchal J., Cordonnier N., Chavatte P., Vignon X. “Lymphoid hypoplasia and somatic cloning.” *Lancet*. 353: 1489-91. As cited in: D’Silva, Joyce. “Farm Animal Cloning from an Animal Welfare Perspective.” *Compassion in World Farming* [www.ciwf.org](http://www.ciwf.org)
- Chavette-Palmer P., Rémy D., Mialot JP. “Health status of cloned animals at different ages.” *Cloning and Stem Cells* 6: 94-100. As cited in: “The Science and Technology of Farm Animal Cloning: A review of the state of the art of the science, the technology, the problems and the possibilities.” Report from the project Cloning in Public. Danish Centre or Bioethics and Risk Assessment.
- Carroll JA, Carter B, Korte SC, Prather RS. “Evaluation of the acute phase response in cloned pigs following a lipopolysaccharide challenge.” *Domestic Animal Endocrinology*. 29 (2005) 564–572
- Jeff Carroll, as quoted in D’Silva, Joyce. “Farm Animal Cloning from an Animal Welfare Perspective.” *Compassion in World Farming* [www.ciwf.org](http://www.ciwf.org)
- Bren, Linda. “Cloning: Revolution or Evolution in Animal Production?” *FDA Consumer Magazine*. May-June 2003. [www.fda.gov/oc/features/2003/303\\_clone.html](http://www.fda.gov/oc/features/2003/303_clone.html); “Animal Cloning and the Production of Food Products: Perspectives from the Food Chain.” *Pew Initiative on Food and Biotechnology and the Center for Veterinary Medicine of the U.S. Food and Drug Administration*. <http://pewagbiotech.org/events/0924/proceedings2.pdf>
- Solomon, Louis et al. “A Brave New Beef: The US Food and Drug Administration’s Review of the Safety of Cloned Animal Products.” *Gender Medicine*. September 2, 2009; Vol. 6, No. 3 at pages 404-407.
- Solomon, Louis et al. “A Brave New Beef: The US Food and Drug Administration’s Review of the Safety of Cloned Animal Products.” *Gender Medicine*. September 2, 2009; Vol. 6, No. 3 at pages 404-407; AND Cowan, Tadlock and Geoffrey Becker. “Biotechnology in Animal Agriculture: Status and Current Issues.” *Congressional Research Service*. January 29, 2010 at 20-21.
- Chavette-Palmer P., Heyman Y., Richard C., Monget P., LeBourhis D., Kann G., Chilliard Y., Vignon X., Renard JP. “Clinical, hormonal, and hematologic characteristics of bovine calves derived from the nuclei from somatic cells.” *Biol. Reprod*. 66: 1596-1603 As cited in: “The Science and Technology of Farm Animal Cloning: A review of the state of the art of the science, the technology, the problems and the possibilities.” Report from the project Cloning in Public. Danish Centre or Bioethics and Risk Assessment.
- Wells D.N., Forsyth J.T., McMillan V, Oback B., “Review: the health of somatic cell cloned cattle and their offspring.” *Cloning Stem Cells*. 6: 101-110. 2004.
- Tian, Cindy et al. “Meat and milk compositions of bovine clones.” Proceedings of the National Academies of Science. May 3, 2005.; 102(18): 6261–6266. AND National Academies of Science. “Potential Environmental Problems with Animal Biotech Raise some Concerns.” August 20, 2002. Press Release available at <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=10418> and on file. Accessed August 16, 2010.
- Tian, Cindy et al. “Meat and milk compositions of bovine clones.” Proceedings of the National Academies of Science. May 3, 2005.; 102(18): 6261–6266.
- Walsh, Marie K., Lucey, John A., Govindasamy-Lucey, Selvarani, Pace, Marvin M., and Bishop, Michael D. “Comparison of Milk Produced by Cows Cloned by Nuclear Transfer with Milk from Non-Cloned Cows,” *Cloning and Stem Cells*. Vol. 5 No. 3, 2003.
- Kumagai, S. Report: Safety of Cloned Cattle as Foods. Ministry of Health, Labor and Welfare, Tokyo 2003.
- Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects. National Academy of Sciences. 2004.
- Eurobarometer. “Europeans’ Attitudes toward Animal Cloning.” 2008 at 20 and 25.
- Consumer’s Union. “Consumers Union Calls on Congress to Require Tracking and Labeling of Clones for Milk and Meat: CU Polls Says 89% of Consumers Want Labels on Cloned Milk and Meat.” Thursday, January 17, 2008. Press Release available at [http://www.consumersunion.org/pub/core\\_food\\_safety/005362.html](http://www.consumersunion.org/pub/core_food_safety/005362.html) and on file. Accessed August 13, 2010.
- Kaplan, Karen. “The Beef About Clones” *Los Angeles Times*. February 10, 2005.
- Eurobarometer. “Europeans’ Attitudes toward Animal Cloning.” 2008 at 10.
- Frommer, Frederick J. “Dairy Industry Treading Cautiously on Cloned Cows.” Associated Press/Aberdeen News. July 11, 2005.
- United Kingdom Food Standards Agency. “Summary of Investigation on cloned animals.” August 11, 2010. Available at <http://www.food.gov.uk/news/newsarchive/2010/aug/summarycloninginvestigations> and on file. Accessed August 23, 2010.
- Poulter, Sean and Sarah Bruce. “As big supermarkets vow NEVER to sell clone meat or milk, the Mail tracks down the farmers with 96 more clone cows.” Daily Mail. August 5, 2010.
- UK FSA. Stakeholder Meeting on clones and offspring. August 11, 2010.
- UK FSA. Stakeholder Meeting on clones and offspring. August 11, 2010.

### For more information:

web: [www.foodandwatereurope.org](http://www.foodandwatereurope.org)  
email: [europe@fwwatch.org](mailto:europe@fwwatch.org)



Copyright © September 2010 Food & Water Watch