Milk, Moo, or Man Made?

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Abstract

The production of food has progressed rapidly within the last several decades, due in part, to the advancements in the field of science. One branch that continues to evolve is the cloning of livestock. Cloning has been a significant part of the scientific world for many years and it remains a controversial issue today. Since the early 1990's, animals have been cloned mainly for breeding purposes and mass production of milk. Livestock cloning has been given the seal of approval by the FDA. In fact, by FDA standards, human consumption of cloned milk and meat products is safe. The FDA is so positive that eating cloned animal products poses no risk to people that it does not even require that these food products to be labeled. Therein lies the controversy. There is not enough long term data to determine the health risks to those who eat cloned animal foods. Since the FDA does not regulate clear and truthful labeling on cloned meat or milk, consumers have no way of knowing if they are eating cloned or conventionally bred animal products. This paper will examine the issues of using cloned animal products in the food supply and the necessity of labeling these products for consumers.

On July 5, 1996, a sheep named Dolly was born at the Roslin Institute in Edinburgh, Scotland as the first animal clone. She was cloned from the adult cell of a six-year-old female ewe. Since the cell was taken from a mammary gland, scientists were inspired to name their creation after the country singer Dolly Parton, as they felt she is the epitome of the mammary gland. Sadly, Dolly the sheep was euthanized seven years later due to severe arthritis and progressive lung tumors. Currently, the food industry is using advanced Dolly technology for farmers and ranchers to use for breeding animals. Ethical and safety questions continue to be debated as this innovative technology assists farmers and ranchers in rapid reproduction. As a result of mass production of livestock animals, milk and meat taken from the offspring of cloned animals is being processed, sold and ultimately ending up on American dinner tables. To date, there have not been enough long term studies done on the safety of human consumption of these products to determine if there are any lasting effects. Experts in the food industry agree that the main concerns of animal cloning are if they should be used for food products and if it is necessary to label these products for consumers. Since there are many hidden truths regarding cloning in the United States food supply, it would be wise for consumers to, on their own, investigate what is in the food they eat.

In order to determine whether cloned animal products are safe for humans to eat, it is first important to discuss the definition of livestock cloning. According to the Food and Drug Administration (FDA), "cloning is a complex process that lets one exactly copy the genetic, or inherited, traits of an animal (the donor)" (U.S. Food). The FDA also describes cloning as "biological copying" and further explains that "clones are born just like other animals. They are similar to identical twins, only born at different times. Just as twins share the same DNA, clones have the same genes as the donor animal. A clone is not a mutant, nor is it a weaker version of the original animal" (U.S. Food). According to this definition, a cloned animal is a sibling with

the same genetic makeup as the naturally bred animal. Although clones are duplicates, they can reproduce. This, of course, means that babies are being born from replicated animals, which may eventually end up in the human food supply.

Somatic cell nuclear transfer is the process by which cloning takes place (Clone Safety). A somatic cell, which is any cell that is not a sperm or egg cell, is extracted from the animal that is to be cloned (genetic donor). An egg cell is harvested from another female of the same species (egg cell donor). The nucleus of the egg cell containing that animal's DNA (egg cell donor) is removed and discarded, leaving an empty cell. Then, the somatic cell containing the original animal's complete genetic blueprint (genetic donor) is inserted into the empty egg cell, replacing the former nucleus. Finally, the two cells are electrically fused together, creating what will become the clone (Clone Safety). Since limited testing has produced inconclusive results, grocery chains like Whole Foods Market will not supply cloned animal products. They are not alone. Twenty other prominent corporations in the food industry also vow not to provide meat or milk products from cloned livestock, including Kraft Foods, Wal-Mart Stores, Tyson Foods and Ben & Jerry's Homemade Ice Cream (Wall). Natural Grocers is another reputable company that is devoted to animal welfare and that determines animal cloning to be a questionable practice (Natural). Choosing to err on the side of caution, it is not surprising that these companies refuse to offer consumers cloned animal products, regardless of the FDA findings.

The U.S. Food and Drug Administration is a government agency that carries several important responsibilities for the safety and well-being of the nation. According to its website, its duties include "protecting the public health by assuring the safety, efficacy and security of … our nation's food supply" (U.S. Food). Therefore, when the FDA puts its stamp of approval on a product, it is considered safe for the community. Cloned animals for human consumption are regarded as safe as eating naturally bred livestock by FDA standards. The agency states that the "FDA found that it could not distinguish a healthy clone from a healthy conventionally bred animal" (U.S. Food). In addition, the FDA also determined that "Milk from dairy clones does not differ significantly in composition from milk from conventionally bred animals" (U.S. Food). For these reasons, the U.S. Food and Drug Administration has deemed milk and food products from clones safe for human consumption and that they pose no threat to consumers.

Yet, there are some stakeholders that dispute the FDA's verdict on cloned animal products. One such investor is Smithfield Foods, the largest pork producer and processor in the United States. This company explains that "Smithfield Foods does not produce meat products from cloned animals and has no plans to do so in the future" (Smithfield). They also state, "Although the U.S. Food and Drug Administration has concluded that meat products from cloned animals are safe for human consumption, the science involved in cloning animals is evolving" (Smithfield). Thus, they remain skeptical. Smithfield Foods and their sister companies raise fifteen million pigs annually and process twenty- seven million pigs a year (Smithfield), yet they do not embrace cloning technology. This corporation chooses to mass produce by natural breeding methods.

According to their website, Smithfield Foods has built a reputation on integrity and responsible sustainability with the public as well as its other shareholders. The company proclaims, "Producing safe, high-quality, and nourishing food is fundamental to our company's very existence. Our customers and consumers put their trust in us every time they sit down to a meal of one of our many products" (Smithfield). Smithfield Foods also states that the organization holds itself accountable to the public by adhering to a high standard of raising

livestock in a stress free environment. While they do mass produce, Smithfield Foods believes that treating their animals with dignity and nourishing them with quality feed shines through in the flavor of their meats (Smithfield). Furthermore, as a global company represented in twelve countries, Smithfield Foods is dedicated to remain an ethical food industry leader and uses only traditional animal breeding techniques (Smithfield). They will not support replicating practices without concrete evidence of its long term success.

It is interesting to note that other large companies in the food industry also refuse to supply cloned meat products. Whole Foods Market's policy concerning cloned animal products is "Whole Foods Market does not intend to sell meat or milk from cloned animals. We require producers who sell to us only use natural breeding or artificial insemination as acceptable breeding methods" (Whole). Likewise, it is also the policy of Natural Grocers not to provide cloned animal products that they believe are "of questionable quality or safety, and therefore will not sell them" (Natural). Natural Grocers organic food company believes that "Cloned animals give more power to large factory farm operations that are known to provide inhumane living conditions which negatively impacts the nutritional quality of the meat and dairy products from the animals" (Natural). These markets cater to health conscious people and desire to provide fresh wholesome alternative food and nutritional products that will support health and well-being of the consumers.

On the other hand, Dr. Pascale Chavatte-Palmer, of the Institute National de la Recherché Agronomique of France, supports the FDA ruling. She has a doctorate in animal reproduction and is a leading authority with an extensive background in laboratory research on cloned animals (Chavatte-Palmer). Dr. Chavatte-Palmer conducted a recent four year exhaustive study on fifty Holstein heifers. The control group was comprised of twenty five cows created by artificial insemination. The remaining twenty five females were clones produced by somatic cell nuclear transfer. The experiment tested complete chemical and physiological makeup; everything from blood samples to skin biopsies, including prenatal and postnatal monitoring. After carefully documenting her results, Dr. Chavatte-Palmer reported that overall, the clones developed and thrived equal to their traditionally bred counterparts (Chavatte-Palmer). Her study revealed that there were no apparent differences detected in the immune system, blood, or any other physical characteristics of cloned animals compared to traditionally bred livestock (Chavatte-Palmer). Although Dr. Chavatte-Palmer is a distinguished authority on the subject of animal cloning, it is important to point out that she lives and works in the country of France, where the study took place. Animal cloning practices for France are regulated by the European Union, not the FDA (Innogen). Therefore, cloning laws in Europe are subject to different criteria than the regulations for animal cloning in the United States.

In the article "A Primer on Cloning and Its Use in Livestock Operations," the FDA explains the benefits of cloning for farmers. "By cloning his prize cow, breeding the clones, and keeping their offspring, the farmer can introduce the natural positive characteristics into the herd quickly. It would take several more years to achieve these same improvements by conventional breeding" (U.S. Food). The article goes on to say that "Farmers can also clone animals to produce more uniform quality meat. Take, for example, a male swine (boar) that time after time sires offspring that mature quickly and provide lean meat. If a farmer has several of these boars he could quickly produce an entire herd with consistent, high quality meat" (U.S. Food). The article continues this line of reasoning with, "Cloning gives the farmer complete control over the offspring's inherited traits" (U.S. Food). Rapid replication of healthy livestock may be useful to farmers; however, sexual reproduction has been successfully used for centuries as the only

method of mass production.

Although Dolly's birth was celebrated by scientists all over the world as the first cloned mammal, the public may not be aware that it took two hundred seventy-six previous attempts to "successfully" clone her. One of the problems discovered after Dolly's birth was that other cloned sheep were becoming severely ill. In January of 2000, it was found that a highly contagious but incurable virus called sheep pulmonary adenomatosis (SPA) was infecting the sheep clones, causing multiple tumors to grow in their lungs and eventually killing them (Roslin). Eight months later, it was confirmed that Dolly's second litter of lambs was infected with SPA (Roslin). Dolly produced six lambs total, including one set of twins and one set of triplets. In addition to SPA, Dolly also was suffering from advanced arthritis and was experiencing difficulty walking. Anti-inflammatory drugs were dispensed but to no avail (Roslin). Her arthritis was diagnosed when Dolly was just four years old. The average lifespan of Dolly's breed of sheep is ten to twelve years. Dolly succumbed to her diseases at six years of age and it was decided by the doctors at the Roslin Institute to humanely end her life with a fatal dose of anesthetic (Roslin). It should be remembered that Dolly was cloned from a sheep that was already six years old; therefore, at birth, Dolly's cells were advanced in age. This is significant because Dolly's telomeres at death were discovered to be only half the length of a traditionally bred sheep of the same age (Abpi). Telomeres are the end segments of chromosomes located on each DNA strand (Abpi). During cell division, the telomeres shorten over time with each replication until they eventually disappear completely (Abpi). This damage to the DNA has been linked to old age (Abpi). In Dolly's case, her telomeres at birth were essentially half the length they should have been. Thus, upon death, Dolly's cells were the same age as a twelve year old sheep.

Unfortunately, not only did Dolly and other cloned sheep acquire this fatal lung disease and premature debilitating arthritis, but these illnesses were also passed down to their offspring (Roslin). Furthermore, in a report published by the National Academy of Sciences in 2004, the organization stated, "Cloning is very inefficient and leads to many abnormal and stillborn animals" (Medtech). However, they were unable to determine if these complications would be harmful to humans if they were to consume meat from clones. They also said that the success rate of cloned animals at that time was "between 0.1 percent and 3 percent, depending on the type of animal" (Medtech). Research on cloned animals is contradictory at best. Dr. Chavatte-Palmer and the FDA claim studies done on clones provided information that clones were healthy and were indistinguishable from conventionally bred animals. Yet, data released from the Roslin Institute and other organizations, like the National Academy of Sciences, report the opposite was true.

While the technique of somatic cell nuclear transfer may be cutting edge in the scientific world, it is disturbing to realize that diseases are being bred into the next generations of cloned animals. These descendants are the ones that end up in the slaughterhouses and in the food supply. It is equally disturbing that the consumer is not informed about these defective clones entering America's food supply. In this day and age of celebrity chefs and reality cooking shows bringing food consciousness to American consumers, accurate food labeling is a growing concern for the public. The U.S. Food and Drug Administration does not regulate food labeling on cloned animal products because they concluded that "cloning poses no unique risks to animal health, compared to the risks found with other reproduction methods, including natural mating… there are no additional risks to people eating food from cattle, swine, and goat clones or the offspring of any animal clones traditionally consumed as food" (U.S. Food). However, Whole

Foods Market believes "any food derived from cloned animals should be required to be labeled as such to allow consumers to make informed decisions on the meat and milk they buy" (Whole). Natural Grocers agrees that cloned products should be labeled because "Compared to naturally-raised grass-fed cows, beef from factory-farmed cows have a lower nutrient content (zinc, CoQ10, CLA, Vitamin E, etc.) and higher omega-6 fatty acid content" (Natural). Without truthful labeling, the average consumer would be unaware if he was purchasing food made from cloned animals and therefore would not have the opportunity to select these products voluntarily.

Senator Barbara Mikulski from Maryland and Connecticut Congresswoman Rosa DeLauro both introduced federal bills demanding cloned food to be labeled. Additionally, Massachusetts, Missouri, Kentucky, New Jersey, Washington, New York, North Carolina and California all have presented state bills on the issue of cloned food labeling (Wired). In 2007, California Senator Carol Migden introduced a bill known as SB 63, requiring clear, recognizable food labeling on all cloned animal products, including milk (Wired). The legislature passed both the state House and Senate, but it was subsequently vetoed in 2008 by Governor Arnold Schwarzenegger (Food Navigator). The California Governor explained that he did not sign the bill because national law already had labeling guidelines in place (Food Navigator). As a result of Governor Schwarzenegger's decision to reject the California Cloned Food Labeling Act, the labeling practices in California have not changed, making it impossible for residents to know if they are consuming cloned food.

Although the California bill died (Food Navigator), the fact that so many states have introduced bills regarding labeling of cloned animal products shows that there are health concerns, even on the government level, about the safety and nutritional content of cloned livestock meat and milk products in the food supply. Furthermore, regardless of the FDA issuing a statement claiming there are no health hazards from eating cloned animal products (U.S. Food), many large stakeholders and national distributors have publicly declared that they will not sell cloned animal products to consumers based on the current research on the safety of these products for human consumption. Consequently, since the FDA has not to date reconsidered its position on cloned animal food products and truthful labeling, the food industry remains at an impasse on the subject of livestock cloning.

According to statistics of the USDA, the annual livestock consumption for 2014 was projected to be, "Beef, 24,350 Pork, 23,420 Lamb/mutton, 150" (U.S. Department). Although detailed records have been publicly revealed concerning abnormalities and diseases being reproduced in the offspring of livestock clones, the FDA still stands by its claim that cloned animal products are safe for human consumption (FDA). Additionally, the FDA has not offered any additional or recent testing on animal clones in order to determine long term effects on people who eat cloned food products. In fact, the FDA has stated, "Cloning doesn't put any new substances into an animal, so there's no "new" substance to test" (FDA). The outrageous truth is that while farmers and ranchers benefit financially from mass production breeding by way of somatic cell nuclear transfer, the American citizen who purchases the milk and meat is at an extreme disadvantage because he does not have the ability to know the source of these food products. With so much meat being consumed annually in America, it is appalling that the government agency responsible for ensuring public safety and monitoring the nation's food supply would not err on the side of caution. The FDA regulates clear and truthful food labeling for all meat, poultry, milk, and egg products in this country; however, it has no mandate for disclosing whether these food items are produced by cloned animals (U.S. Food). If the FDA truly believes that cloned food products pose no threat to humans, then there is no reason not to

provide full disclosure on cloned animal products. Consumers have a right to know what they are eating and feeding their families. It should be left up to individuals to decide if they want to purchase conventionally bred or cloned animal products.

In an effort to display good will to their patrons, numerous large corporations in the food industry remain adamant that they will not adhere to selling cloned animal products, with or without clear and honest food labeling. This action sends a very strong message to the public. By presenting a united front against the FDA and its rulings, it is clear that these companies mean to imply that the FDA is untrustworthy. The fact remains that consumers have several choices concerning the food they eat. First, they can personally research livestock cloning. Secondly, consumers can switch brands of the food they buy to ones who do not sell cloned animal products. Additionally, they can shop at grocery chains like Walmart, Whole Foods Market and Natural Grocers, where they are assured the food they purchase is safe and free of cloned meat or milk items. Clearly, discovering the hidden truths about cloning in the American food supply will empower consumers to make informed decisions concerning the food they put on their tables.

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