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Integrating Modern Business Values and Cloning

The Legality, Morality, and Social Responsibility of Somatic Cell Nuclear Transfer

Blanche A. Williams¹, Frank J. Cavico² and Bahaudin G. Mujtaba³

Abstract

Science and technology have catapulted the possibilities of cloning into reality. Over the past few decades, cloning has given rise to aggressive research and business opportunities that have transformed society's views on the scientific and commercial uses, as well as abuses, of cloning. The advent of cloning, therefore, has engendered a multitude of implications and consequences that our society, legal system, religious, and scientific communities continue to struggle with. How does the public embrace, laws protect, religion condone, and morality support the research, science, and implementation of cloning? The worldwide involvement in cloning, moreover, is an indication that this practice has secured widespread recognition and influence. This paper will explore the science of cloning, the companies involved, the laws that affect it, the ethics that guide it, and the social responsibility of its participants and presence in our global society's future.

Keywords: Cloning, somatic cell nuclear transfer, ethics, morality, and social responsibility.

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1 Introduction

Like Galileo and Newton, scientists and researchers have attempted to explain the mysteries of life, our planet, and the universe, often accompanied with rigorous debate and a “fair share” of controversy. With the advent of cloning came a multitude of future ramifications that our society, legal system, religious, and scientific communities continue to struggle with. How does the public embrace, laws protect, religion condone, and morality support the research, science, and implementation of cloning? The worldwide involvement in cloning is a clear indication that cloning has secured widespread recognition and influence. Worldwide acceptance of cloning, however, is another matter indeed. This paper explores the science of cloning, the companies involved, the laws that affect it, the ethics that guide it, and the social responsibility of its participants and presence in our global society’s future.

Science and technology have catapulted the possibilities of cloning, which is otherwise known as somatic cell nuclear transfer (SCNT), into reality. Once viewed as science fiction, cloning has given rise to aggressive research and produced business opportunities that have transformed society’s views on its use and commerce.

2 History of Reproduction

The history of reproductive technology began evolving less than 60 years ago, when the understanding of deoxyribonucleic acid, also known as DNA, was in its infancy. In 1943, American scientist Oswald Avery proved that DNA carried genetic data. This sparked a global race to discover the composition of DNA. Ten years later, scientists James Watson and Francis Crick declared they had “found the secret of life” (Public Broadcasting Company, n.d.). Watson and Crick discovered the structure of DNA as the substance that programs instructions for living things to be built and replicated. It was this scientific breakthrough that

transformed the understanding of human genetics and exploration into the now apparently endless possibilities of cloning technology.

Since the first tadpole was developed from a “nuclear transfer” transplant in 1952, the number of cloning researchers and companies worldwide has grown considerably (USA Today, 2002). However, it would not be until 1997 before embryologist Ian Wilmut would advance this transplant process to produce Dolly, a sheep, considered the first mammal cloned. This scientific miracle was followed by others, including mice, calves, pigs, horse, gray wolf, cats, rabbits, and goats (Food and Drug Administration, 2009).

It was Dolly’s creation in 1997 that sparked a barrage of criticism and trepidation within medical and religious communities. President Bill Clinton issued an executive order prohibiting the use of federal funds for human cloning while going a step further and requesting companies to voluntarily terminate the practice of human cloning until a research study by the National Bioethics Advancement Council was completed. This study later recommended legislation to ban human cloning. It was also during this time that nuclear physicist Dr. Richard Seed announced he would clone the first human being; however his efforts subsequently were not efficacious.

For the next six years, cloning companies were busy creating a host of animals, leading up to 2003, when Clonaid, purportedly the first *human* cloning company, lead by Dr. Brigitte Boisselier, announced the birth of cloned baby girl, named Eve. This revolutionary scientific breakthrough caused subsequent debate, legal battles, and moral reflection. Together, science, business and religion now would face its most daunting challenge – to confront the legality, morality, social responsibility, and practicality of cloning. The prospects and possibilities now were as countless as the potential consequences – beneficial and deleterious.

2.1 What is Cloning?

Cloning, or somatic cell nuclear transfer, is a process by which animals and humans are created asexually. This reproduction technology is devoid of the traditional concept of combining a male sperm and female egg for procreation. *BusinessWeek* (Raeburn, *et al*, 2002) states that “‘cloning’ simply means copying. Identical twins are clones, copies created naturally when cells divide in the womb” (p. 44). Why is that controversial, asks *BusinessWeek*? Human cloning involves taking someone’s DNA – extracted from, say, a skin cell or a hair follicle – and inserting it into an unfertilized human egg from which the existing DNA has been removed. Such an egg could theoretically develop into a human being if implanted into a uterus” (Raeburn, *et al*, 2002, p. 44).

The *New York Times* (Kolata, 1993) explained: “Clones are genetically identical individuals, a phenomenon that happens naturally in humans with the birth of identical twins or triplets. In a cloning procedure that has long been applied to cattle, an embryo is divided into separate cluster of cells, each of which is then implanted in the womb and develops in the normal way” (p. 4G). Cloning of humans, in essence, takes a cell from a person, uses its nucleus to replace the nucleus in a woman’s egg, and then has her grow it in her womb to produce an infant with DNA that is identical to the person from whom the original cell was taken (Tasker, 1997). Cloning creates offspring that are the genetic duplicates of a single parent, whereas in conventional reproduction, genes from two people, a male and a female, are carried by the egg and the sperm, are commingled to produce a unique offspring (Zitner, 2001).

There are three types of cloning technologies, to wit: 1) therapeutic, 2) reproductive, and 3) recombinant DNA technology (Human Genome Project, 2009). *Therapeutic cloning* is designed to yield stem cells to be harvested for the treatment of degenerative diseases, organ replacements, and/or research. Using therapeutic cloning, a doctor theoretically could take a sample of one’s DNA, place it into a human egg, and grow neurons and cells identical to one’s own, and

thus less likely to be rejected (Raeburn, *et al*, 2002). Such cloning thus could be used to help treat stroke and Alzheimer's patients, to help restore movement to paralyzed people, and could also be used to help diabetics, for example, by cloning pancreatic cells and then transplanting them into the pancreas of diabetics to produce insulin that their pancreas are not producing (Raeburn, *et al*, 2002). *Reproductive cloning* is used to propagate the genetic DNA of an animal with a current or existing animal, including extinct or rare species, along with human subjects. Reproductive cloning could be used for human beings. Potential beneficiaries of human cloning would be infertile couples, the parents of a deceased child, relatives of beloved family members, people with certain "favored" traits, celebrities, and gay people who do not wish to reproduce with members of the opposite sex (Andrews, 1998, p. B5). *Recombinant DNA* technology transports a section of DNA from one organism to a self-duplicating genetic component for the purpose of engineering a specific sequence, as in the case of genetically designed food (Human Genome Project, 2009). As stated on the government website, the U.S. Food and Drug Administration (FDA), is responsible for "protecting the public health by assuring the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, our nation's food supply, cosmetics, and products that emit radiation. The FDA is also responsible for advancing the public health by helping to speed innovations that make medicines and foods more effective, safer, and more affordable; and helping the public get the accurate, science-based information they need to use medicines and foods to improve their health" (FDA, 2009, Para. 2) Therefore, the agency is charged with acting in the best interest of the public's health, especially as it relates to advancing and integrating new technologies, such as cloning, directly into our society. Figure 1 depicts the difference between a traditional or "natural" reproduction process and reproduction assisted by technology (Kenyon College, 2010).

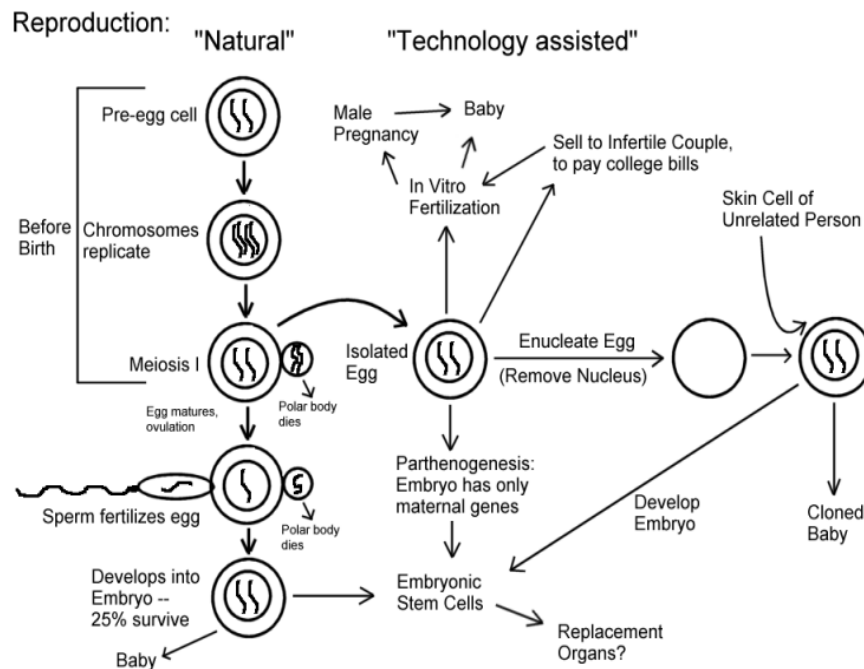


Figure 1: Stem Cells and Human Cloning (Kenyon College, 2010)

A milestone in human cloning was achieved in 2001 by the scientists at Advanced Cell Technology in Worcester, Massachusetts, when company scientists used cloning techniques to produce several early human embryos, each from a single cell taken from an adult. The goal was to grow them to a level where they would become human embryonic stem cells, which then could be converted into possible replacement tissues, in order to help patients suffering from degenerative diseases and paralyzing injuries; but the cloned embryos died before reaching a key stage in their development (Weiss, 2001). Nonetheless, the *Miami Herald* deemed this cloning attempt to be the “first bona fide creation of cloned human embryos,” and underscored that the scientific cloning team had “crossed a significant religious and political line” (Weiss, 2001, p. 2A). Significant, very recent, developments also have occurred in the field of embryonic stem cell research too. Scientists have always stated that embryonic stem cells could lead to a cure for a variety of diseases, such as diabetes, Parkinson’s, and Alzheimer’s disease, as well as for spinal cord injuries, because these cells can turn into almost any tissue in the body.

Nevertheless, these cells can only be obtained by destroying days-old embryos, which some people equate to the killing of human life and thus condemn as unethical and immoral. However, the *Miami Herald* reported in October of 2010 (Miami Herald Staff and Wire Report, October, 1, 2010) that a “breakthrough” had been made in this scientific field, to wit: a technique had been developed to rapidly create safe alternatives to human embryonic stem cells, which the newspaper deemed to be a major advance in producing a “less controversial” means to treat many medical problems (p. 1). Scientific experiments have been conducted, related the *Miami Herald*, that laboratory-made versions of naturally occurring biological signals can rapidly change ordinary skin cells into cells that seem to be identical to embryonic stem cells; then these cells can be turned into specific tissues that could be a match for transplantation into patients (Miami Herald Staff and Wire Report, October 1, 2010). Furthermore, in addition to the scientific developments, there have been very recent legal developments regarding embryonic stem cell research.

The *Miami Herald* reported in October of 2010 that a U.S. Court of Appeals had overturned a lower federal court ruling that the Obama administration’s new and more permissive policy on funding for embryonic stem cell research violated a federal law which prohibits taxpayer funding for studies that involve destroying human embryos (Miami Herald Staff and Wire Report, October 1, 2010). Based on the appellate ruling, the federal government in the United States now can continue to fund human embryonic stem cell research, but pending the ultimate outcome of a lawsuit challenging it (Miami Herald Staff and Wire Report, October 1, 2010). Accordingly, the *Miami Herald* also reported in October of 2010 that embryonic stem cell research in the form of clinical cell implantation trials is currently being conducted at The Miami Project to Cure Paralysis on a patient paralyzed by a spinal cord injury as well as at the University of Miami and other locations to determine if this therapy is effective – and safe (Miami Herald Staff and Wire Report, October 12, 2010). However, as pointed out in the *Miami*

Herald (Weiss, 2001), “there is a big difference between cloning a human embryo in order to create a human being and using laboratory techniques to produce stem cells and other cellular therapies to treat diseases such as Parkinson’s, cancer, or Alzheimer’s” (p. 2A).

2.2 Animal Cloning

Agricultural researchers experimented with transgenic or genetically manufactured animal cloning to dramatically increase its production capacity along with its business profit margins. By cloning the strongest genetic farm livestock, companies have designed animals that produce leaner meat, larger amounts of milk, medications, and organs for human transplant that are resistant to disease. This translates to a competitive advantage in the marketplace. Consumers, however, unknowingly are being subjected to cloned products in the marketplace, and this exposure has raised questions about food safety and the effectiveness of government regulations. In 2008, the FDA conducted a risk assessment study that studied the compatibility and risks of cloned milk and meat products from cows, goats and pigs with those produced through traditional breeding methods. The results claimed that cloned foods were “as safe as food we eat everyday” in addition to finding no scientific reasons to require labeling of these cloned food; however, the FDA contradicted its position by stating that cloning is designed to breed animals not produce food (Food, Drug and Administration, 2008).

The Center for Food Safety, an organization dedicated to protecting human health and the environment, has publicly criticized the FDA for its lack of regulation and protection, of the American public, from potential food safety risks, defective clones, or long-term side effects from the consumption of cloned animals. In its 2007 report, the Center for Food Safety clearly outlined its findings and highly recommended the FDA “institute a mandatory moratorium on food or feed from cloned animals” until appropriate standards were reached. Even then, they strongly urged the use of consumer product labels (Center for Food Safety, 2007).

Labeling cloned food products, however, would institute an added financial responsibility for companies and states. Even so, 13 states introduced legislation that would require labels on cloned items. Consumers, that are aware of the cloned products, are supportive of the legislature; however, industry leaders are opposed to legislature that will impact their profits (Gogoi, 2008). Unfortunately, putting profits ahead of safety would later become a point of contention and ethical attention and deliberation.

In the United States, each state appears to approach labeling differently. For example, the State of Vermont passed legislation requiring labeling, however the legislation only mandated the labeling of seeds, while Alaska law only mandated labels on transgenic fish. Ironically, one of the biggest arguments in the labeling debate, stated by animal biotechnology specialist Alison Van Eenennaam, is the fact that clones are basically identical to the animals they came from, and there's no way to scientifically tell them apart from each other, therefore such labeling cannot be enforced (Gogoi, 2008). The food industry has begun to voice its opinion and to make its decision known. Organic grocery companies, like Whole Foods Market, are not concerned because cloned products don't meet organic food standards and therefore will not be used in its stores. Other leading food companies including Ben & Jerry's, Kraft Foods, and General Mills, have also chosen not to incorporate cloned products into their foods. With this decision, consumers will have a few more choices when selecting non-organic food items. However, without major food chains involved, this approach, unfortunately, will reveal the economic disparity between lower- and upper-income Americans and their food-chain choices. Upper-income Americans are more likely to be able to afford Whole Foods prices, or even have a Whole Foods located in their immediate neighborhood, as opposed to lower-income Americans and economically challenged communities that can only afford to shop at traditional grocery chains, which will potentially sell the majority of cloned products in the mainstream marketplace (Gogoi, 2008).

The debate over labeling cloned food products has become a political issue. Senator Barbara Mikulski, a Democrat from the State of Maryland, is dedicated to reviving the Cloned Food Labeling Act, which required the FDA and the Agriculture Department to label cloned food, by stating that this product comes from a cloned animal or its progeny. Mikulski believes that it gives customers the right to know the facts and allows modern scientists to monitor developments and new research (Gogoi, 2008). In June 2010, the Science Advisory Board, comprised of 2,415 life science professionals, convened to participate in a survey designed to shed insight on the current and future state of cloning. The survey revealed the following: 1) the Board is in agreement that therapeutic research should be developed but clearly distinguishable from reproductive research; 2) the Board questioned the government's ability to address the myriad of issues surrounding cloning; 3) the Board believed that cloning will continue to grow with or without regulations or protections, due to private funding sources; and finally 4) the Board criticized the media and its effort to promote false perceptions that create conflict and fuel controversial debates (Science Advisory Board, 2004). As technology advances, it is evident that ethical and regulatory safeguards lag behind, unfortunately, at the expense of the public's health and safety. Regulations, however, are not designed to impede business but rather to protect consumers.

Pets have also been cloned. For example, the *Wall Street Journal* reported in 2005 that a California bio-technology company, Genetic Savings & Clone, Inc., announced that it sold a cloned cat to a woman for \$50,000 as she wanted a replacement for a deceased, and apparently beloved pet (Regalado, 2005). This company along with several other companies sells "designer pets," that is genetically designed pets such as glowing fish and allergen-free cats (Regalado, 2005). The *Wall Street Journal* also reported, however, that animal rights organizations are trying to convince the legislature to ban the practice because of fears that cloning will cause abnormalities to the animals and that vulnerable

consumers could be deceived by promises that their pets could be replicated (Regalado, 2005). Nevertheless, the cloning of pets could be a very emotional and thus powerful issue (Tasker, 1997). To illustrate, “since a dog’s lifespan...is so much shorter than its owner’s, that owner could clone the dog when it died, raise the new dog from puppyhood, and repeat it several times over the owner’s own lifetime” (p. 5G). Cloning of animals, in addition, could be used to help endangered species to survive (Tasker, 2009).

2.3 Cloning Companies

The number of cloning researchers and companies worldwide has grown tremendously since the first tadpole developed from a “nuclear transfer” transplant in 1952. There are several leading companies and research institutes, around the world, including the United States, Canada and the United Kingdom, concentrated in the expanding scientific and technological arena of cloning. Their involvement has expanded the technology utilized in agriculture and medicine; namely artificial insemination, in vitro fertilization, and transferring embryos. Accordingly, there exists continuous scientific debate, ongoing research, and advancements, while the market and opportunities continue to expand. The ethical and religious debate concomitantly continues to intensify. Clonaid, founded in 1997, under the leadership of Dr. Brigitte Boisselier, claimed to be the first cloning company in the world and the first to create a human clone, named Eve, born on December 26, 2002 (Kendall, 2005). Clonaid’s laboratory was based in the Bahamas, but was later closed by its government and forced to find refuge in a more tolerant country. Michael Jackson was reportedly one of the celebrities linked to Clonaid (2010).

Advanced Cell Technologies (ACT), formed in 1994, now based in California, where it relocated after the passing of California’s Proposition 71, a critical stem cell initiative that allocated \$3 billion in funding for 10 years. ACT has concentrated a large portion of its efforts on human embryonic stem cells, while successfully having cloned calves and an endangered ox (Kendall, 2005). ACT

recently acquired its competitor, Infigen, and received its patent for the coveted nuclear transfer process (Advanced Cell Technologies, 2010). L'Alliance Boviteq (LAB), based in Canada, specializes in the production of bovine embryo (Kendall, 2005). LAB gained notoriety with its production of the first bull, from an adult cell, and identical twins, in association with the University of Montreal (Boviteq, 2010). Cyagra is a premier livestock cloning and genetic preservation company, based in Pennsylvania (Kendall, 2005). It helps cow breeders increase their inventory through cloning technology. With thoughts toward the future, pet lovers wanted to clone their beloved pets, Cyagra has partnered with PerPETuate, a cell banking technology, to store pet cells for future cloning (Cyagra, 2010).

Geron Corporation, based in California, specializes in human embryonic stem cell research including cloning (Kendall, 2005). In 1999, Geron acquired Roslin Bio-Med, a company formed by the Roslin Institute. As a result, Geron now owns the patents on Roslin's nuclear transfer process. In 2008, Geron merged with ViaGen, a leading firm in animal genomics and livestock cloning, whose focus was on developing "animals that secrete therapeutic proteins in their milk, to produce humanized antibodies for use as vaccines," in addition to cloning family pets (Geron, 2010). The Roslin Institute Scotland, based in the United Kingdom, is the research institute where Ian Wilmut, renowned embryologist, originally cloned the first sheep, Dolly, in collaboration with PPL Therapeutics. They specialized in cloning cows, pigs and a sheep, named Polly, whose genes were used to treat hemophilia B (Kendall, 2005). The company was later closed but sold its patents to Exeter Life Sciences, in 2004, which Geron Corporation later acquired (Geron Corporation, 2010).

2.4 Cloning Costs

Cloning is considered a niche business vs. mainstream because of the exorbitant expense of the technology. For animal cloning, it appeals to owners of select farm stock with funding sources willing to invest in future profitability of the

technology, as the demand increases. There is a substantial price differentiation between the costs for cloning a calf at \$25,000 compared to purchasing a unit of bull's semen, for breeding, at \$50 (Gellene, 2001).

With human cloning the number escalates substantially. While animal eggs are numerous and potentially less costly, scientists, like Rockefeller University's Peter Monbaerts, estimates that this same process for a human clone could cost upwards of \$2 million (Herper, 2001). In therapeutic cloning of human organs, the cost associated with the treatment of one patient could exceed \$100,000, including the payment of multiple donors and the medical procurement of the eggs (Herper, 2001). This substantiates the theory that cloning will undoubtedly be more accessible to the influential and affluent. Cloning "costs," however, can go beyond "mere" money. Many people condemn cloning because they assert it is unsafe, and that, in particular, children could be born with severe mental injuries and/or physical deformities, if these children survived at all (Raeburn, *et al*, 2002).

In an attempt to track cloned livestock inventory, cloning companies are poised to voluntarily pay to be included in a registry developed by companies, like ScoringAg, that provide worldwide tracking, recordkeeping and documentation of livestock in real time (Madrigal, 2007). While for human donors, legislators suggested registration through the Department of Health and Human Services with informed consent from donors.

While costly for cloning companies to produce, the cost to purchase cloned products, such as organs or fetuses, could be a major stumbling block or deterrent for consumers. It is also unknown if traditional health insurance companies would cover the cost for cloned organs or reproductive fetuses. This dilemma would intensify yet another medical discussion which could potentially require the structural revision of healthcare policies, premiums, and industry regulations.

3 Legal Perspectives

The legal implications are daunting since cloning as well as embryonic stem cell research are routinely condemned as immoral and unethical, and consequently “targets” for prohibitive legislation; yet nevertheless scientific advances in these fields reflect and advance cherished, and also legally held, values in the United States, to wit: the right to reproduction and the pursuit of happiness (Woodward, 1997). Some accordingly say that in the United States there is a prevailing view that there is a presumption of privacy and liberty as to how we live our lives, and particularly when it comes to reproductive rights and what people can do with their bodies and the way they can make babies (Kolata, 1993). Payne (2010) raises the issue that any law that prohibits the use of cloning and embryonic stem cell research to help people have children contravenes their reproductive rights, “particularly upon the rights of those who are unable to have genetically related children without reproductive assistance” (p. 944). Payne provides two examples: “These techniques could be particularly important for same-sex couples who would otherwise be unable to have children that are genetically related to both partners. Infertile couples might also benefit from these developments because...they would be able to have genetically related children” (p. 944). Payne (2010) raises the following important and fundamental constitutional issues that will have to be addressed and answered if cloning or embryonic stem cell research is prohibited in the United States, to wit: whether such prohibitive laws on reproduction and child creation would infringe on the right to privacy, the freedom of expression protected by the First Amendment to the Constitution, and whether such laws would contravene the “liberties” protected by the Due Process clause of the Constitution. Payne (2010) believes that court precedent interpreting the protections of the Bill of Rights as well as the Due Process clause, especially in cases where the right to have children as well as the right to purchase and use contraceptives to prevent conception, have been deemed to be “fundamental” rights protected by the U.S. Constitution (p.p. 966-68). Legal scholars also have

positioned cloning as a “right to research” within the First Amendment by arguing that cloning challenges and explores cultural, ethical, legal, and political norms (Smith, 2004). Political scientist, Walter Burns testified, in 1977, in front of the House Subcommittee on Science Technology and Space, used the famous Supreme Court case of *Griswold v. Connecticut* to support cloning. Legal scholar, R. Alta Charo, also supported the argument that cloning research is protected under the First Amendment as “expressive conduct” equivalent to traditional speech (Alexander, 2004). Reproductive cloning is argued to be a “fundamental” right; and furthermore that procreation too is “fundamental” as a legal right and also to the very existence and survival of the human race as well as one of the basic civil rights of people, as manifested in the famous Supreme Court cases of *Skinner v. Oklahoma* and *Planned Parenthood of Southeastern Pennsylvania v. Casey*, where procreation was deemed to be protected by the Fifth and Fourteenth Amendments to the United States Constitution (Foley, 2009).

Yet, to complicate matters considerably, in the United States, the prevailing legal view is that life does not begin, at least legally, the moment an egg and sperm are joined; “personhood” does not commence in the law at the moment of conception; and thus the embryo is not a legal person (Rosato, 2001). Nevertheless, many conservative, religious, and right-to-life groups in the United States strongly believe that life does begin at conception, and thus that cloning as well as embryonic stem cell research are morally wrong and thus also should be crimes.

To date, in the United States, as of the writing of this article, there are currently no federal statutes against cloning. A key legal issue is whether to make it a crime to engage in experiments in which a copy of a person’s DNA is inserted into a human egg. However, federal funds cannot be used for the cloning of humans. This does not preclude private funding, which is permissible in over 15 states in the United States. In addition, the State of California, with the passing of Proposition 71, allocated \$3 billion dollars over 10 years, and included projects for

cloning, but excluded human babies (National Conference of State Legislatures, 2008).

Following the 1997 announcement by Dr. Richard Seed that he was close to cloning the first human, President Clinton placed a ban on federal funding for cloning along with requesting a voluntary cessation on research. Between the years of 1997-2003, there were several attempts to pass legislation banning the technology, with no success. In 2007 several Prohibition bills, HR. 2560: Human Cloning Prohibition Act, HR 2564: Amendment title 18, US Code, and S. 812: Human Cloning Ban and Stem Cell Research Protection Act, were introduced, but failed to pass Congress (Foley, 2009). Currently, there is a lack of federal legislation in the United States regarding human reproductive cloning; but Payne (2010) asserts that generally “legislation, policies, and guidelines in the United States prohibit human reproductive cloning” (p. 956). Yet since there is no specific federal statute banning cloning in the U.S., the Federal Drug Administration (FDA) has jurisdiction of all cloning procedures and technology (Payne, 2010). Payne (2010) reports that since all research projects using cloning technology must be approved by the FDA, and since the FDA has stated that it would not approve any research projects involving the cloning of human beings, human cloning is effectively prohibited in the United States, though attempts by Congress to pass explicit anti-cloning legislation have so far failed in the United States.

Statewide in the United States, regarding embryonic stem cell research, Payne (2010) reports that six states – California, Connecticut, Illinois, Massachusetts, Nebraska, and New Jersey – have promulgated legislation in favor of embryonic human stem cell research; and that two states – Michigan and Missouri – have gone further by providing in their state constitutions that human stem cell research can be conducted. On the federal level in the United States, the Obama Administration by Executive Order in 2009 reversed the Bush Administration restriction on federal funding for stem cell research; expanded the federal funding

available for stem cell research; and empowered the National Institutes of Health to provide the funding pursuant to agency guidelines (Payne, 2010). The U.S. Congress is presently considering a bill that would amend the Public Health Service Act to provide for human embryonic stem cell research, so long as the stem cells come from excess embryos created for purposes of fertility treatment and are donated from in vitro fertilization clinics (Payne, 2010).

Regarding human reproductive cloning in the United States, several states now have enacted statutes banning human cloning, including California, Connecticut, Iowa, Louisiana, Massachusetts, Michigan, Rhode Island, and Virginia (Payne, 2010; Kolata, 2001). One state – Missouri – has banned the use of state funds for cloning (Payne, 2010). In 2001, the House of Representatives passed the Weldon-Stupak bill (HR 2505), imposing criminal penalty for those undertaking human reproduction and research cloning in the United States (Zitner, 2001), while a substitute bill, the Greenwood-Deutch Bill, imposed a 10 year ban, but was defeated. Legislative opponents of cloning have raised the arguments that it is immoral, unnatural, and unsafe (Zitner, 2001). Alternate bills, Brownback-Landrieu and Specter-Feinstein Bills, have been deadlocked in the Senate (American Association of Science, 2003, p.13). Opponent bills, such as Brownback-Landrieu, based its arguments on 1) preserving “genetic uniqueness of humans”; 2) ethical class of an embryo; 3) inadvertent negative results of cloning; 4) profit-making manipulation of women to create demand for human eggs; and 6) possible risks to egg donors. Supporters, however, emphasize the potential healing remedies associated with cloning research (American Association of Science, 2003, p.13).

On a global stage, in 2007, the United Nations General Assembly, instigated by the United States, passed a resolution, 84 to 34 with 37 refraining from voting, which encouraged governments to prohibit all human cloning, considered as incompatible with human dignity as well as the protection of human life (Lynch, 2005). While the resolution passed, it was not legally binding or fully supported.

In Great Britain, in 2001, the government promulgated legislation, called the Human Reproductive Cloning Act of 2001, which imposed a ten year prison sentence or a fine or both on anyone who implanted an embryo in a woman other than one produced by fertilization (Payne, 2010; Weiss, 2001). That country's health minister said the reason for the law was that cloning was unsafe and unethical (Weiss, 2001). The European Union has a Convention, ratified by 18 countries as of 2009, which expressly forbids cloning, and which specifies that the prohibition applies regardless of whether the cloned human is alive or dead (Payne, 2010). Many other countries around the world have passed anti-cloning legislation (Payne, 2010). Furthermore, in 1997, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) passed a Declaration that human cloning should be prohibited because it is contrary to human dignity; and the World Health Organization (WHO) also proclaimed a stance against cloning until more research can be conducted concerning the morality and safety of cloning (Payne, 2010). Nevertheless, many countries do allow some form of cloning research and production; and Payne (2010) notes that some countries, together with the WHO, make a distinction between reproductive and therapeutic cloning, with the latter being more acceptable because it may advance medical treatment and technology.

One appropriate and basic cloning legal proposal is "to create a government oversight body with the authority to license fertility clinics, assess what reproductive technologies may be safely offered and by whom, and require the collection of follow-up data on the children created by these technologies (Andrews, 1998, p. B5). The current legal, moral, and scientific debate about human cloning certainly affords society the opportunity as well as imposes an obligation to devise laws that govern human cloning. However, it should be noted that at times science has a way of outdistancing legal as well as ethical restraints.

4 Ethics Perspectives: A Utilitarian Analysis

Cavico and Mujtaba (2009) defined ethics as “the sustained and reasoned attempt to determine what is morally right or wrong,” whose rationale is to “develop, articulate, and justify principles and techniques that can be used in specific situations where a moral determination must be made about a particular action or practice” (p.5). The President’s Council on Bioethics in 2002, “found research cloning to be ethically permissible,” while many governments are consciously exploring the future impact of reproductive and therapeutic cloning on the long-term health and welfare of their country and its citizens (American Association for Advancement of Science, 2003). Nonetheless, the ethics battle, in the “court of public opinion,” rages on. An FDA report, released in 2008, revealed that the majority of the American public did not support animal cloning and would not feed their children cloned milk or meat; yet the FDA went forward in approving the use of animal clones in the food market without requiring “conspicuous” labeling. The public, in this study and countless other polls and surveys, has voiced its myriad of concerns, including long-term effects of eating cloned food, negative mutations within cloned offspring, identifying the benefits of cloned food, and animal cruelty. The FDA is being criticized for this decision by the public, as well as scientific, religious, and ethical communities.

The Consumers Union’s conducted a poll on cloning that stated 89% of consumers want appropriate labels. Some experts say that the FDA is perhaps more concerned with pleasing the biotechnical industry than in truly addressing the safety and ethical concerns consumers have about cloning in the modern business era where profits are often emphasized more than social responsibility.

Is it moral for companies to experiment with human and animal cloning? The research and experimentation of cloning has resulted in the creation of organs that can save lives, livestock that can increase the food supply, and potentially the creation of human beings that can make the dream of children a reality. However, the long-term impact of this technology remains questionable and controversial.

When examining the consequences of an action to determine its morality, one typically would be employing the Utilitarian ethical theory.

Utilitarianism is a consequences-based ethical theory. This theory was created by the English philosophers and social reformers Jeremy Bentham and John Stuart Mill. They wanted an ethical theory that was mathematical and scientific, egalitarian, as well as one that would make a difference “on the ground” in ameliorating the very harsh laws and business and social practices of their time (Cavico and Mujtaba, 2009). The Utilitarians believed that pleasure and pain were the “sovereign masters” of human beings; that is, people seek pleasure and avoid pain. The object of their ethics, therefore, was to produce as much pleasure, in the sense of happiness and satisfaction, as possible, and naturally to avoid or to mitigate pain. The cardinal principle of the Utilitarian ethical theory is that an action is moral if it produces the greatest amount of good for the greatest number of people (Cavico and Mujtaba, 2009). Consequence, accordingly, determine the morality of an action, to wit: predominant good consequences equal a good, right, and moral action; and predominant bad consequences equal a bad, wrong, and immoral action. It is important to point out the action itself is neutral; rather the consequences of the action are critical to ascertaining morality pursuant to this ethical theory. Since everyone feels pleasure and pain, everyone gets “counted” under this ethical theory. However, when the measuring and “counting” are done, it is the overall “number,” that is, the determination of predominant good or bad consequences that determines morality. As such, there may be negative consequences stemming from the action, but if the overall result is a preponderance of positive consequences, the action is moral (Cavico and Mujtaba, 2009).

A challenge with this ethical theory, which is supposed to be mathematical and scientific, is to figure out exactly how this “counting” of pleasure and pain is to be done. The first step is to state the action that is to be analyzed pursuant to this ethical theory. In this article, of course, the action is cloning. Then a determination

must be made of the stakeholders, or constituent groups, that are directly or indirectly affected by cloning. Next, a determination of the good or bad or mixed good and bad consequences must be ascertained for each stakeholder group. The idea is that one must predict, based on one's intelligence, "storehouse" of knowledge, and using history and precedents as one's guide, the reasonably foreseeable consequences – short- and long-term – of putting an action into effect. Then, these consequences must be weighed, and a determination must be made if there are predominant good or bad consequences on each stakeholder group. Since this theory is supposed to be mathematical, the authors would suggest that a basic numerical scale be used to quantify the good or bad consequences for each stakeholder group. This scale would range from -5 to -1 to 0 to +1 to +5 and would represent the amount of pleasure or pain for each stakeholder. Finally, the numbers would "simply" be added up; and if there was a positive number the action would be moral; and conversely if there was a negative number than the action would be immoral. In this way, the authors seek to "do justice" to the Utilitarians and their consequentialist, egalitarian, and "scientific" ethical theory (Cavico and Mujtaba, 2009).

Utilizing the Utilitarian ethical approach, therefore, cloning will be analyzed from both the negative and positive consequences it produces for the affected stakeholders. In essence, does the good that may be produced from cloning outweigh the bad? There are direct and indirect stakeholders of cloning that represent broad aspects of the ethical analysis: cloning companies, researchers and scientists, private investors, clone donors, distributors/brokers, organ recipients, pharmaceutical companies, grocery store chains, food consumer, cloned animal, cloned human, mental health professionals, school systems, media, regulatory agencies, Congress members, religious organizations, and the scientific community. In the following paragraphs various advantages and disadvantages are presented on a scale of 1 to 5 (5 signifying maximum benefits or pleasure, and a minus 5 signifies maximum pain or cost).

The benefits of therapeutic cloning to the victims of a stroke or Alzheimer's disease could be hugely positive as well as to other people suffering a condition that results in a loss of brain cells, since implanting brain cells might correct or ease their symptoms (5). Cloning companies, including their board of directors and shareholders, benefit from the research, sale and use of cloning technology (5). Researchers and scientists, associated with the technology, benefit as the creators of the technology (5). Private Investors benefit from a return on their investment (5). Clone donors benefit from payment of their donation (5). Distributors/brokers benefit from the identification of interested parties for organs, livestock and human clones (5). Organ recipients benefit by decreasing their wait time for transplants which potentially prolong their life (5) Pharmaceutical companies, that manufacture immunosuppressive drugs, suffer because of there is potentially less rejection of engineered organs; therefore, there would be less use of their medications (-5). Grocery store chains can benefit from the sales of cloned milk and meats, which do not require labeling for the public (5). Food consumers could potentially suffer from purchasing unlabeled cloned milk and meats (-5). The cloned animal will be slaughtered and sold or used for additional experimentation (-5). The cloned human being benefits by being born and raised like any other traditionally born child (5). Cloning might be more effective and less expensive than current reproductive technologies to help infertile couples (Andrews, 1998); but cloned children may suffer by experiencing unanticipated mental and physical health issues (-3). School systems welcome cloned children but may be unprepared for potential academic or behavioral issues (-3). Media benefits from the increase in viewers, readers, or listeners due to the heated controversy of cloning (5). Regulatory agencies, of the government, protect the public consumers and citizens (-1). Members of Congress must represent their constituents in this controversial issue (3). Religious organizations view the destruction of embryos for research and experimentation as akin to abortion; and they view cloning as "playing God"; consequently, they continue to battle the

scientific community and lobby the government officials to stop cloning and embryonic stem cell research (-5). The scientific community benefits by advancing research, experimentation, and engineering of clone technology, all of which may produce ways to treat intractable diseases and injuries (5).

Together these stakeholders and consequences represent the influence that cloning has over our nation and within our society. The sum of the negative consequences is -27 and the sum of the positive consequences is 58, with a grand total of positive 31. Therefore, based on the Utilitarian ethical approach, cloning would be considered a morally right action, producing more good than bad (Cavico and Mujtaba, 2009). Cloning thus is moral (at least pursuant to this ethical theory).

In light of these calculations, if cloning is deemed to be moral pursuant to a major and traditional ethical theory in Western philosophy, how will our society handle the reality of consuming cloned food products? How will our religious, educational, and family units welcome human clones into our communities? Will we pursue perfection in cloned children as opposed to traditionally born children? Will the answers to these questions lead to negative consequences or positive ramifications for future generations? Recall that one is supposed to predict consequences pursuant to Utilitarianism. Yet if one attempts to predict consequences so far into the future, one may merely be guessing and speculating, and thus not be sufficiently “scientific” for a very weighty determination of morality or immorality.

4.1 Cloning and Religion

In the Religious Ethics theory, morality is defined in terms of the will of God and the precepts of a religion. With this in mind, cloning, by all accounts, would be considered immoral and not sanctioned by God; however; one will not find a scripture supporting its immorality. Some theologians argue that humans were created in God’s image; therefore, cloning would be tantamount to rewriting the story of creation and redefining the structure of God’s authority over mankind, the

heavens and earth. Religion, consequently, could be allowed to dictate business activities, like cloning, in accordance to the Bible, Quran, and general spiritual guidance. However, Cavico and Mujtaba relate that morality does not necessarily always depend on God or religion, since there may be atheists and non-believers, but rather morality always depends on philosophic ethics (2009, p. 21). One can be, and naturally should be, moral, irrespective of religion. An individual may not “have religion,” but one surely has reason and intellect and thus can reason from ethics to morality.

To provide a religious perspective in addition to the religious reaction to cloning as discussed in the Utilitarian stakeholder analysis, the authors will briefly present certain views of Islamic religious scholars and organizations regarding cloning. A leading Islamic scholar, Dr. Abdulaziz Sachedina of the University of Virginia, has written extensively, and is quoted frequently, on the theological dimension of cloning pursuant to the religion of Islam. Sachedina (2010) first notes that Islam does not have a central institution like the Pope and the Vatican of Christianity; consequently, there are many religious schools of thought as well as many legal and ethical interpretations of the Qur’an and Muslim religious law, called the Shari’a. Initially, Sachedina (2010) relates that the Qur’an “suggests that as participants in the act of creating with God (God being the best of the creators) human beings can actively engage in furthering the overall wellness state of humanity by intervening in the works of nature, including the early stages of embryonic development, to improve human health” (p. 2). Therefore, Sachedina (2010) continues: “In Islam human manipulation of genes made possible by biotechnical intervention in the early stages of life in order to improve the health of a fetus or cloning the meaning of embryo splitting for the purpose of improving the chances of fertility for a married couple is regarded as an act of faith in the ultimate will of God as the Giver of all life” (p. 2). Furthermore, “since the therapeutic uses of cloning in IVF (in vitro fertilization) appears as an aid to fertility strictly within the bounds of marriage, both monogamous and

polygamous, Muslims have little problem in endorsing the technology” (Sachedina, 2010, p. 2). However, Sachedina (2010) cautions that “in light of the limited knowledge that we have as to who would be harmed by cloning or whose rights would be violated, Muslim legal rulings are bound to reflect a cautious and even prohibitive attitude to the cloning beyond treatment of infertility or assessment of genetic or other abnormalities in the embryo prior to implantation” (p. 3).

Illustrations of this caution and prohibition against cloning can be gleaned from the reports made on the website *Islam 101* (2010), which provides an overview of Islamic views on cloning and other scientific topics, such as evolution, stem cell research, embryology, in the context of the Qur’an and Islamic teachings. One Islamic perspective therein on cloning is from Dr. Muzammil H. Siddiqi, who asserts that the “full-fledged” use of cloning technology should be prohibited because it could cause danger to the human personality, danger to human dignity and honor, the danger to the family and society (Islam 101, 2010). Similarly, Dr. Mohammed al-Morsi Zahra, dean of the faculty of theology and law at the United Arab Emirates University, declared that human cloning is not permissible under Islam because it destroys the fundamental social concepts of the family, married life, and parenthood (Islam 101, 2010). Another comparable Islamic view on cloning is from the 9th Fiqh-Medical Seminar, which maintains that human cloning should not be permitted, unless, however, “exceptional” situations emerge and these cases are ruled in conformity with the Shari’a (Islamic) law. The Organization of the Islamic Conference (Islam 101, 2010) raised “serious concerns” about the cloning of human beings principally due to an underlying fear that cloning technology could fall into the hands of unethical people who would use it for “nefarious” purposes. The Islam 101 (2010) website also reported an Associated Press story that the highest religious decision-making body in Malaysia has banned human cloning, condemning the practice as “unnatural and totally against Islam.” Moreover, the website related a French news story which

indicated that Tunisia has called for a treaty banning human cloning in Arab countries (Islam 101, 2010). The Islamic attitudes toward cloning, therefore, appear to be very similar to those of the Roman Catholic religion.

Three “mainstream” religious perspectives on human cloning were succinctly related in the *Miami Herald* in an article on the morality and practicality of cloning (Tasker, 1997). A Rabbi at a Broward County, Florida, temple stated: “Human cloning would be wrong. Why would you want to clone a human being other than if it would be genetically superior, or you felt it would be? It takes away the humanity of a person” (Tasker, 1997, p. 5G). A theology professor at a Catholic university in Dade County, Florida, stated that “in our tradition, new life is supposed to be the result of cooperation by two human individuals who, of their free will, act to produce, with God’s creation and will, another human life, as an expression of their love” (Tasker, 1997, p. 5G). The Vatican, in particular, has been vociferous in condemning cloning even if cloning is used to save other lives because the production of an embryo destined for destruction is immoral (Weiss, 200; Woodward, 1997). A representative of an Islamic education institute in Broward County stated that cloning “would be immoral under Islamic law. A family comes into existence with the marriage of two people. It’s the nucleus of society. This cloning business is experimental; the family nucleus is nowhere to be found” (Tasker, 1997, p. 5G).

4.2 Cloning and Kantian Ethics

Although the ethics of the German philosopher, Immanuel Kant, is premised on religion, specifically the Christian religion and particularly the Golden Rule of the Christian Bible, Kant made his ethics secular and reason-based. Kantian ethics assumes that people possess intellect and act in a rational and logical manner. Recall that Utilitarianism is a consequences-based ethical theory; yet Kant says in making moral determinations one must disregard consequences and instead apply a formal test to ascertain the morality of an action (Cavico and Mujtaba, 2009).

Now, one can plainly see a major dilemma in ethics, particularly in “modern,” Western, secular-based ethics, to wit: the two main ethical theories – Utilitarianism and Kantian ethics - are diametrically opposed! Actually, Kant condemned the Utilitarian ethical theory as immoral! Said Kant, how could an ethical theory possibly morally legitimize pain and unhappiness (Cavico and Mujtaba, 2009)?

Kant called his formal ethical principle the Categorical Imperative. “Categorical,” meaning that this is (at least according to Kant and Kantians!) the supreme test for morality; and “Imperative,” meaning that Kant believes that one will be able to reason to what it means to be moral based on this principle; but then comes the “hard part,” the imperative, whereby one must have the strength of character to do what one knows to be moral, and not do what one knows to be immoral, regardless of the consequences (Cavico and Mujtaba, 2009). An important component of the Categorical Imperative is the Kingdom of Ends test. Pursuant to this ethical precept, Kant states that for an action to be moral it must treat people with dignity and respect, as worthwhile human beings, as “ends” in themselves, and not as mere “means” or instruments to achieve even a greater good. As such, if an action demeans, disrespects, or dehumanizes a person or persons, or treats them like a thing or object, the action is immoral. The idea, the objective, the ideal is for all people to live in this “kingdom” where everyone is treated and treats others with dignity and respect and as worthwhile “ends.” How does cloning and embryonic stem cell research fare under this moral test? Experimenting on human beings, even in their earliest stage of development, is morally wrong, state certain ethicists (Raeburn *et al*, 2002). Furthermore, since embryonic stem cell research involves the destruction of human life, one morally can argue that it is tantamount to killing, the ultimate demeaning and disrespecting of a person; and thus the practice would be immoral under Kantian ethics. As to the morality of cloning under Kantian ethics, it logically would seem that cloning, if it entails the creation of a clone and then the destruction of the clone this practice, would also be

deemed immoral since it is tantamount to the killing of another human being (Naik, 2007). The destruction of a human embryo is morally wrong, categorically, whatever the alleged benefits. A human life begins at the moment egg and sperm are united, and thus nothing should be done to an embryo that is not in its interest. The embryo is a worthwhile Kantian “end” and not a mere means or instrument or thing to produce some alleged greater good. The beneficial consequences for others, whatever they may be, therefore, cannot justify the destruction of human life (Wade, 2001). Furthermore, if cloning is used to produce “superior” human beings, one is entering into the problematic field of eugenics, which could be viewed as “inherently discriminatory,” and thus potentially immoral under Kantian ethics (Woodward, 1997, p. 60). Moreover, some ethicists say that by deliberating making copies of human beings, one lessens the worth of the human being, which is demeaning and disrespectful. Yet, in fairness, it must be noted that some people do not see stem cells or embryos as fully developed persons deserving of moral worth and dignity; rather they are just clumps of microscopic cells (Woodward, 2001). The ethical conflict between Utilitarianism and Kantian ethics is plain to see: that is, what value should be placed on human embryos, and how should this worth of embryos be balanced with the many people in society who might be helped by cloning and embryonic stem cell research (Woodward, 2001). The moral answer, it appears, would depend ethically if one were a Utilitarian or a Kantian!

Aristotle’s *Doctrine of the Mean*, another Western, secular-based, ethical principle, serves to distinguish between positive and negative extremes, as well as to provide a guide to excellence, virtue, and the “good life” (Cavico and Mujtaba, 2009). Aristotle strived to create harmony, balance, and practicality in emotions and actions, while finding a common middle-ground between excess and deficiency. Moderation is the seminal principle for Aristotle – ethically and practically. Cloning, obviously, is an “expensive” proposition financially, physically, emotionally, ethically, and spiritually; yet scientific advancement in

this field is undeniable. How does one find the balance between capitalism and casualties, science and sensibility, logic and emotion, and morality and practicality? When President Clinton asked for a voluntary cessation on human cloning, he was asking for, in essence, “The Doctrine of the Mean,” that is, a moderation in the speed at which we approached an avenue of science with major societal implications, many of which we could not foresee. Federal funding was banned; but the President “left the door open” for private investors, thereby allowing cloning research to continue. Accordingly, pursuant to Aristotle’s Doctrine of the Mean, by adhering to the Mean and habitually acting on the Mean, one will act in a good manner, with “good” meaning acting in a moral and practically efficacious manner. One thereby will become a “virtuous” person in Aristotle’s sense of acting right and rightfully. Thus, “attaining the mean presupposes both the right state of character and the right intellect” (Cavico and Mujtaba, 2009, p. 41). Regarding cloning, Aristotle would advise to avoid the extremes; that is, avoid a total ban on cloning, abjure completely open-ended human cloning, and rather adopt a cloning policy that is delimited and regulated. What that latter policy should be, however, is the key question. “The middle-road is the safest,” advised the Roman philosopher and statesman, Ovid. Again, where is this “middle-road” for cloning?

4.3 Cloning and Ethical Position

Surprisingly, these ethical theories, when tested, have proven that cloning, while controversial, may be moral depending on the ethical theory utilized. Recall that ethics is, in essence, a branch of philosophy, that there are many different ethical theories, that some of these ethical theories, like Utilitarianism and Kantian ethics, are diametrically opposed, and that unlike the law, there is no “Supreme Court of Ethics.” At times, where one stands morally depends on where one stood ethically. Nevertheless, ethical analysis does expose the fact that traditional ethics is exploring a brand new territory where the implications can only be imagined, and

not definitively, or even scientifically, predicted. As the cloning “industry” unfolds, and consequently clones increase within the marketplace, moral standards of practice will have to be developed, and then must be firmly and ethically established and adhered to by the medical profession, the scientific community, and the cloning companies. These moral standards can be philosophic based and they also can be based on the codes of ethics of the professions, companies, and organizations.

Ethics also includes the ethical codes of companies, organizations, and the professions. These codes are naturally premised on foundational ethical principles, such as doing the greater good and treating people with dignity and respect. Accordingly, critical to any discussion of the morality of cloning is the code of ethics of the medical profession. The American Medical Association (AMA), the first national professional medical organization in the world, stated in its Code of Ethics that cloning-for-biomedical-research appears to be consistent with medical ethics, but requires appropriate oversight and monitoring from regulatory bodies such as the Office for Human Research Protections (2003). The AMA went on to stipulate that the cloning process must include educated consent and participation along with an explanation of procedures and potential repercussions. This statement provides a major ethical foundation for the supporters of cloning research and technology. Since the field of cloning as well as embryonic stem cell research is largely unregulated, those individuals, businesses, universities, hospitals, and professions involved in these scientific endeavors must govern and regulate themselves, for example, by establishing ethical guidelines and establishing cloning and stem cell oversight committees composed of scientific, medical, legal, and ethical experts. Suggested ethical rules from the National Academy of Sciences would be not to pay donors for eggs or other human tissues and not to inject human stem cells into animal embryos (Regalado and Dumcius, 2005). The safest and most practical “middle road” would be to permit cloning and embryonic stem cell research to continue but in a carefully regulated manner,

instead of making such practices illegal and thus forcing scientists “underground” or to forcing them to flee to other countries (Rosato, 2001).

What will be most interesting to see in the future is whether cloning companies, like other business entities, will adopt codes of ethics, and what these codes of ethics say about how cloning is to be practiced and regulated and governed internally by a cloning company and ultimately the cloning industry.

5 Social Responsibility Perspective

Beyond the value of legality, based on the law, beyond the value or morality, based on ethics, is the value of social responsibility, typically characterized in a business context as CSR (or corporate social responsibility). This value raises the issue of what a company or organization or for that matter a medical or scientific community, should be doing beyond the dictates of the law and the precepts of morality for society as a whole and its stakeholder or constituent groups. In a corporate or business context, social responsibility typically implies actions by a company that are charitable and civic-minded and that benefit the local community and society as a whole (and which are not required by the law or by ethics).

Cloning potentially has the ability to improve the quality of life for those who are currently suffering from life-threatening diseases or will potentially face them in the future. Should cloning companies provide free or low cost cloning services to people who desperately need such services and who are too poor to pay for them? Should the cloning companies be socially responsible like the large pharmaceutical companies which have given or sold at very low cost AIDS drugs to some African nations? Cloning companies certainly do not have a legal obligation to provide free cloning services to the needy and poor. Furthermore, it can be argued that they do not have a moral responsibility. Yet do they have a larger and higher social responsibility to certain segments of the community who

need such charitable cloning. How do we balance the social responsibility for seeking and providing cures for our society with the potential effects of unknown or untested scientific advancements? There are those within the scientific, religious, and political arena, who fear the future implications of the technology, including Alabama Republican Senator Richard Shelby, who stated that cloning “undermines the value of human life and portends unimaginable ethical choices.” He wanted Congress to “define the boundaries of ethical science” (Shelby, 2001). Nonetheless, Congress has been unable to pass a federal bill that bans cloning. Yet imagine the reaction of the Senator as well as his conservative political, spiritual, and philosophical allies, to the preceding social responsibility discussion that not only presupposes the legality and morality of cloning but also raises the issue of free or low-cost cloning for the poor!

Evidently, exploring how cloning would transform our world, as we know it, is a discussion for all involved – and clearly a heated one. In the interest of humanity, while the advancement of science is inevitable, there are many concerns and fears which must be addressed, in the short- and long-term, to fully comprehend the impact of cloning on the future of our civilization. Here are just a few weighty considerations:

- Cloning could eventually replace natural reproduction and the traditional belief that God has authority over the miracle of human creation.
- Cloning companies could create a specially designed militia or workforce.
- Cloning could create a black market for celebrities, scientists, athletes, and other prominent people (Farnsworth, 2000).
- Cloned humans may be treated as “second-class citizens” (Farnsworth, 2000).
- Cloning could hurt the stability of the family; socially and psychologically (Farnsworth, 2000).
- Cloning could cause the devaluation of humanity (American Association for the Advancement of Science, 2003).

- Cloning could lead to unnecessary birth defects in children.
- Cloning could provide opportunities for scientific fraud and business corruption.
- Cloning could provide the rich an unfair advantage for their children.
- Cloning could be performed by unlicensed or unregulated scientists.
- Cloned children could experience social difficulty later in life.
- Cloning could cause shortened life-spans, based on high mortality rates, health conditions and disease.
- Cloning could potentially impact the evolution of humanity and its ability to adapt (Miley, 2010).

This summary of concerns may be the sentiment of many; nevertheless, there are still those who believe that without access to cloning technology we would be unable to blaze the scientific trails necessary to defeat disease, hunger, and infertility. Society will have to determine whether the rewards outweigh the risks. The scientific, ethics, religious, and scholarly leaders of our time, will have to address these legitimate concerns, while expressing to their respective constituents, the inevitability of the presence of cloning in the world. Cloning is no longer improbable scientifically, yet its legality and morality will be debated for years to come. The authors hope that this article has raised these momentous issues and presented and discussed them in a thoughtful and balanced way. Cloning – Is it legal? Is it moral? And what should a “socially responsible” scientific cloning “industry” be doing for society? Those are the critical, thought-provoking, and provocative questions that must be addressed and ultimately answered.

6 Summary

The authors have explored a multitude of present and future implications related to cloning in America and throughout the world. Each type of cloning provided

unique challenges from a legal, ethical, and social responsibility standpoint. Governing bodies tend to be more tolerant of therapeutic cloning because there are less moral implications and more tangible benefits such as organ transplants and cures for debilitating diseases including Parkinson's, Alzheimer's and diabetes. However, the issue of reproductive cloning is cloaked in the convolution of religious beliefs, conviction, and fear of the unknown. This paper revealed how several ethical theories support cloning, several laws protect it, and with proper leadership, it can attain a level of social responsibility.

Cloning has unraveled the belief system that supports a majority of humanity's existence. While American law is designed to separate church and state, the nation's motto "In God we trust," remains the central theme and belief system driving the opposition. Cloning, however, represents the realization that science has no religion and will continue to evolve and advance funded by private enterprise and regulated by selective agencies. It is critical that the government take the lead on the unresolved issues that surround the issues of cloning. Being guided by enforceable laws, ethical standards, and structured social responsibility, will guarantee a degree of control and calm about how cloning will impact our everyday lives.

Ultimately, regardless of what we believe, science continues to forge ahead by pushing the boundaries of possibilities. Therapeutic cloning will harvest organs that will save millions of lives and reproductive animal cloning could feed millions around the world. Consumer safety is legal, ethical and socially responsible, therefore the FDA and Congress must make sure the fears and concerns expressed are addressed sufficiently, regardless of the profit potential of outside investors. It is true, we cannot stop progress but we can make sure that our citizens are protected, informed, and prepared for the scientific advancements that cloning technology provides.

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