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breakthroughs in medicine are discovered. With these new developments serious ethical and moral questions arise. Advancements in genetic engineering, reproductive technologies, cloning, organ transplanting, and human experimentation are all causes of concern.

The Human Genome Project, an incredible scientific undertaking determined to produce a map of the human DNA code, will tell us how each gene or group of genes function (Lemonick and Thompson 44). With this map, scientists and doctors will be able to figure out how genes can malfunction and cause deadly diseases. Of course, they will also know what each gene controls, and how to manipulate and control our genes to get the specified, desired results. This is exactly the type of tool researchers need to perfect the science of eugenics.

Eugenics- a powerful word from the Greek stem meaning good in birth (Gray 84). In the past, it was thought that we could improve the quality of the human race by making it impossible for those with undesirable traits to reproduce. Charles Davenport once said that he hoped human matings could be placed on the same high plane as that of horse breeding (qtd. in Gray 84).

Many states in the United States have put into place laws that required people in custody with hereditary defects to be sterilized (Gray 85). The false science of eugenics and purification of the human race swayed these states. One such example of this is the 1927 Supreme Court case of Buck vs. Bell. The result of this case was the sterilization of Carrie Buck, the seventeen year old daughter of a feeble-minded mother; the mother a seven month old

daughter, already determined to be of subnormal intelligence; legally declared a moral imbecile herself.

But the concept of purging our race was not present in the United States alone. Hitler's concept of eugenics consisted of sterilizing the blind, schizophrenics, and those with terrible physical deformities (Gray 85).

Now, with the advancement of genetic engineering, genetically altering the human race has made a huge leap forward. Soon scientists will be able to genetically pre-determine nearly every characteristic new-born children are likely to have. Doctors will be able to determine how tall a child will be, what type of body they will have, what illnesses they will be resistant to, and even their IQ and personality (Lemonick 64). As Jeremy Rifkin, a critic of biotechnology, says, It's the ultimate shopping experience: designing your baby. In a society used to cosmetic surgery..., this is not a big step (qtd. in Lemonick 64).

However, the gene or combination of genes that make up these favored characteristics have not yet been found, so it is not yet possible to engineer a variety of genes, both in and out of the fetus (Lemonick 64). According to a TIME magazine poll, if given the choice of which traits a person would choose for his or her child, sixty percent of those responding would choose to rule out a fatal disease. Thirty-three percent of the people would request greater intelligent, twelve percent desired to influence height or weight, and finally, eleven percent of those questioned would determine the sex of the child (Lemonick 64). Also, according to the same survey, thirty-nine percent of those polled believe that parents with genetically linked diseases ought to be

required to test their children for them, while fifty-five percent did not (Lemonick 64).

When speaking of genetically altering genes to obtain the proverbial perfect baby, one must address the issue of genetic discrimination. If researchers are able to locate the exact genes that determine our mental traits or characteristics, could zealous parents or possibly the government use this ability to destroy any characteristics they see as undesirable and remove them? Then proceed to add the traits they consider good and guarantee everyone receives them (Yount 86)? The issue of genetic discrimination will become more and more prevalent as society continues to strive toward perfection, and new methods of obtaining this are developed. As geneticist Karl A. Drlica said in 1994, What we now call an average child may eventually be considered defective (qtd. in Yount 80). This is a relatively easy point to defend. When a group of parents is genetically altering the future generation to perfection, those not engineered will be at a disadvantage. Soon we will have the technology to escape having children with certain defects, such as attention-deficit disorder, below-average height, lower intellect, homosexuality, or a possible genetically linked disease. Will those individuals still possessing these traits be ostracized and made to feel even more inferior (Lemonick 66)? Canadian biologist N. J. Berill stated it well when he said: Sooner or later one human society or another will launch out on this adventure of using gene alteration to produce people with certain characteristics, whether the rest of mankind approves it or not. If this happens, and a superior race emerges with great intelligence and longer

lives, how will these people look upon those who are left lagging behind?... They, not we, will be the heirs to the future, and they will assume control.

(qtd. in Yount 86) Are all of these theories on an emerging superior race unfounded and irrational? If researchers use the new science of genetic engineering to achieve positive results, is there really any issue? As the editor of the Economist said in 1992, ... People have a right to make what they want of their lives... (qtd. in Yount 81).

But the question of genetic discrimination has not yet been adequately covered. There are many every-day situations in which this could rear its ugly head. For example, if employers were given access to the genetic history of potential employees, might they be hesitant to hire a candidate that has not been altered, if only because they would then have to pay more for health care (Yount 81)? When given the choice between a proven medical endorsement and a possible health disaster, it is not difficult to make a decision.

Insurance companies are eager to obtain access to policy holders' genetic records. With these records, insurers will be able to determine possible health risks more accurately. However, insurers claim they are only replacing the old method of using medical check-ups and life expectancy calculations with the latest technology (Kirby). According to a TIME magazine poll, most people do not support the practice of charging higher premiums for those with a genetic predisposition to health problems. Eighty-eight percent of those questioned did not agree with higher rates, as opposed to the eight percent that did (Golden 59).

Insurance worries and workplace conflicts are not the only situations where this problem becomes apparent. There is new evidence that sexual orientation is partly genetic in nature. If scientists discover this to be true, will it curb discrimination by proving sexual orientation is instinctive, or will it compound the problem, and result in destruction or alteration of all fetuses showing this mannerism (Kirby)? The problem of genetic discrimination is being addressed. On November 11, 1997, the UNESCO General Conference adopted the Universal Declaration of the Human Genome and Human Rights. This declaration states: No one shall be subjected to discrimination based on genetic characteristics that is intended to infringe or has the effect of infringing human rights... (Kirby). Currently, over seventy genetic discrimination bills are being debated in twenty-four states, and more than thirty states have laws forbidding genetic tests for job or health insurance applicants. Also, the Health Insurance Portability and Accountability Act of 1996 makes it illegal for health insurers to deny coverage based on pre-existing genetic conditions (Hallowell 60). Whether or not these various laws and regulations will prove to be effective remains to be seen.

One piece of the puzzle that has been sorely neglected thus far is the fate of those fetuses having defective genes. Will parents be pressured to abort when confronted with the serious possibility of a genetic disorder? One case in California strongly suggests this is happening. A young woman discovered her child would be born with cystic fibrosis. This woman's health-care organization would cover the cost of the abortion, but denied care to the child if she gave birth to it; however, a lawsuit reversed this decision (Yount 82).

The debate over the ethics of genetic engineering is a heated one. There are many sides to the issues; one must look at the positive, as well as the negative.

Proponents of genetic engineering stress the fact that this technology can be used to do a world of good. The first successful application of this science occurred in 1990. Nine-year-old Cynthia Cutshall and four-year-old Ashanti DeSilva, both diagnosed with immunodeficiency disease, underwent a procedure to replace the defective genes with healthy specimens into their bloodstream; which stimulated production of the enzyme their bodies needed but did not produce. Soon after, both girls became perfectly healthy. Dr. W. French Anderson, one of the surgeons working with the girls, said afterward that it was a social and cultural victory. It launched the field of human gene therapy (qtd. in Wekesser 13). Little did he realize what an impact this life-saving procedure would have on scientists, researchers, doctors, and parents everywhere.

Physicians at the New York Hospital-Cornell Medical Center are claiming to be the first group to apply this form of technology to treat heart disease. Scientist injected a gene telling cells to make new blood vessels into a sixty-year-old man's heart. Their hope is that, eventually, the heart will grow its own bypass (Physicians 6).

Defenders of genetic alterations also claim that this science is perfectly acceptable as long as researchers refrain from doing anything along racist or classist lines (Yount 88). They also state that although we can change the genetic makeup of an organism, we cannot guarantee our attempts will be

successful. In order for something to function properly, all its parts must fit together readily. The only changes that will be successful are those that preserve the internal balance of the said organism (Wekesser 25).

Andrea Kott best summed up these sentiments best when she said: Imagine beating chronic, debilitating, even fatal diseases before they strike. Think of the lives, the medical dollars, that could be saved if doctors could identify individuals genetically predisposed to heart disease, cancer, and other killers, and, through modification of diet, lifestyle, or other risk factors, reduce or eliminate their susceptibility. The possibility seems within reach as an ever-expanding arsenal of gene-testing technologies is developed.

(qtd. in Wekesser 27) It must be stated that the science of genetic engineering does not apply to humans alone. Many breakthroughs have been made in the field of food alteration. Scientists are now able to modify a variety of edible products to achieve a desired effect. But is there a risk to genetically engineering that which we daily consume? Peter Mond, the head of the organization Greenpeace, would tell you that this represents a great hazard. Mond was once arrested for mowing down and uprooting an entire field of genetically modified corn (Congman 43).

Political activists are not the only ones concerned with the issue of genetically engineered food. A Gerber Corporation spokesman verified the suspicion that due to a fax from Greenpeace, the company will cease the use of modified food products in its ingredients (Congman 43).

According to researchers, there are potential risks to altered food. Some of these include the threat of an allergy inducing gene being spliced into a  
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relatively harmless organism, the increased production of poison by an altered plant, and the loss of nutritional content in engineered food (Tangley 40).

Agricultural engineering has also undergone several new advancements. Researchers have been able to develop specimens of corn, wheat, rice, and soybeans that are resistant to disease, pests, and are able to create their own fertilizer. One example of this is the new breed of strawberries scientists are generating. Geneticists have taken the gene that prevents the arctic flounder from freezing in icy water and spliced it into strawberries to make them more resistant to frost (Wekesser 12). One can only imagine what this will do to the year-round availability and price of strawberries. Of course, as anyone from the Cornbelt can see, the rapid reduction of the price of any given agricultural product can devastate the economy.

It is now time to discuss society's ever-growing problem of organ transplanting ethics. It is a sad statistic that more organs are buried each year than the number of patients in need of them (Leone, Biomedical 54). There are over fifty thousand people currently on organ waiting lists, and of those, nearly ten die each day (Leone, Medical 57).

How is this problem to be solved? There is a portion of the medical and scientific field that believes that, in order to provide a constant supply of organ donations, the sale of organs should be made legal. Now, this group does not promote the sale of organs from living donors, rather, the trade of cadaveric organs (Leone, Biomedical 56).

The 1984 National Organ Transplant Act has made the trade of organs for monetary exchange illegal (Leone, Medical 53). However, organ trafficking is legal in Turkey, Brazil, Japan, Iraq, and the Phillipines. Between 1990 and 1995, more than two thousand kidneys were sold annually in the Middle East. The donors were typically poor, relatively unhealthy, and desperately in need of this money to survive (Leone, Medical 54). Opponents of this believe that to accept organs under these conditions is a medical crime.

This question is not an easy question to answer. On one hand, the sale of organs could indeed save many lives. On the other hand, is it worth the risk to initiate that form of commerce? A discussion on the ethics of biotechnology on the human body would not be complete without touching upon new reproductive technologies. This science has gone through extensive developments in the past years.

8. 5 percent of married couples in the United States are infertile (Leone, Reproductive 13). Because of this, several new methods of impregnating infertile women have been developed. One method is zygote intrafallopian transfer, otherwise know as ZIFT. With this method, a doctor inserts the embryo into one of the woman's fallopian tubes, where it travels to the uterus (Leone, Reproductive 13). Another method, gamete intrafallopian transfer (GIFT), is done by injecting sperm and an unfertilized egg into a fallopian tube, at which time conception and implantation will occur (Leone, Reproductive 13). Lastly is the zona cracking method. This technique involves piercing the outer layer of the egg and placing a single sperm cell within the egg, then embedding the fertilized egg into the woman (Leone, Reproductive 13).

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There is yet another well-known fashion for infertile couples to conceive a child – surrogate motherhood. In this process, the fertilized egg of one woman is allowed to develop in the womb of another. Surrogate motherhood has its benefits. It allows a woman who faces a high-risk pregnancy have a child without jeopardizing her own health, and lessens the chances of premature birth. Surrogate motherhood also gives non-traditional families, such as single or homosexual parents, an opportunity to raise their own descendents (Leone, Reproductive 81).

Opponents of reproductive technology argue that the solution to infertility is adoption. However, adoption can be very difficult and expensive. Also, some feel they would not be able to love a child that is not their own offspring (Leone, Reproductive 50).

Progress has been made in the field of genetically testing unborn children, also. Almost nine of every ten pregnant women have undergone some sort of prenatal screening (Golden 56). Most often, this is done to detect spina bifida, neural defects, and Down syndrome (Golden 57). Furthermore, prenatal testing has reduced by more than ninety-five percent the number of Tay-Sachs births in American Jews (Golden 58).

Many couples also opt for a sex determination test. However, in a nation such as China or India, where males are favored over females, what will happen if parents begin actively producing an unbalanced number of males? Boys, like first-born children, are often dominant and aggressive. It will be even more difficult to dispel gender-based customs if society is filled with dominant, first-born males; and submissive, obedient females (Lemonick 66).

Because religion plays such a huge role in the lives of many Americans, this aspect must also be considered. According to the Roman Catholic Church, in-vitro fertilization is morally illicit, and considered sin (Leone, Reproductive 34). The church objects to the fact that children may now be conceived in the absence of a sexual act between a married couple (Leone, Reproductive 34).

Yet another cause for concern is the technology that entitles post-menopausal woman to give birth. A bitter debate over this issue was ignited when a fifty-nine-year-old British woman gave birth to twins. This was made possible through artificial conception (Leone, Reproductive 53).

The chief question in this controversy is whether or not the parents will be able to raise the child. Arthur Caplan, director of the Center for Biomedical Ethics at the University of Minnesota, summed up these feelings when he asked, Is it right to intentionally create children if you know that both parents are likely to be entering a nursing home before the kid is in elementary school? (qtd. in Leone, Reproductive 53) Women are now able to give birth to four, five, six, or more children through reproductive technology. Is this safe for the children? Children who are the products of multiple birth cases are more likely to be small and premature. There is also a four hundred percent increase in the risk of cerebral palsy. Lastly, older mothers are more likely to give birth to an infant with developmental brain damage (Multiple 1). Is it morally right to endorse a situation that may result in an unhealthy child?

There is also an area of study dealing with fetal tissue research. Scientists in Scotland can now deliver a baby mouse created from the egg of an aborted mice fetus, and will soon be able to achieve this with humans (Leone, <https://assignbuster.com/as-our-technology-continues-to-advance-new-breakt-essay/>)

Reproductive 22). Immature eggs can also be collected from a female fetus as early as the ninth week, aged in a petri dish, and be used to create another child (Leone, Reproductive 38).

Fetal tissue research has had its positive effects. Doctors have been able to extract brain cells from aborted fetuses, inserted them into the brains of Alzheimer's victims, and cure or nearly cure the patient.

The application biotechnology on humans is not limited to engineering and reproductive technologies. The frightening truth is that scientific experiments are often performed on American citizens. Perhaps the most gruesome example of this act was during World War II. Nazi scientists performed various tests analyzing the effects of cold, mustard gas, and phosphorous burns on the human body (McCuen 22).

During World War II, Japanese scientists were also involved in this horrid practice. One old farmer described his human experimentation experience; where he dissected a young man still alive, bound to a bed, without anesthetic.

The fellow knew that it was over for him and so he didn't struggle when they led him into the room and tied him down. But when I picked up the scalpel, that's when he began screaming. I cut him open from the chest to the stomach and he screamed terribly and his face was all twisted in agony. He made this unimaginable sound, he was screaming so horribly. But then finally he stopped. This was all in a day's work for the surgeon's, but it really left an impression on me because it was my first time...

(qtd. in McCuen 39) Is human experimentation limited to savage, foreign countries? Unfortunately not. The United States government itself sponsored several thousand human radiation experiments between 1944 and 1974 (United 10). Another example of human experimentation in this country is the Tuskegee Experiment. This was one of the largest known surveys on the effects of untreated syphilis on male Negroes. The controversy over this test erupted when it was made known that patients were denied the option of treatment once penicillin became widely available (McCuen 49).

The United States military has also been extensively involved in human experimentation. In one program, biological and chemical agents were released over highly populated areas such as Hawaii, Alaska, San Francisco, St. Louis, Minneapolis, and more (McCuen 83).

In 1945, seventeen-year-old Navy recruit Rudolph R. Mills volunteered for a gas mask experiment. Little did he know, the test mask he was wearing became less effective with each use. Mills wore the same mask almost a dozen times for an hour each time the test was performed. Mills was left with burns on his chin and cheeks (McCuen 100).

There are regulations to how far researchers can go in their explorations into human experimentation. The Nuremberg Code, which was put into place after World War II, demands the voluntary consent of human subjects during experimentation. It also states that the degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment (McCuen 22).

Finally, perhaps the most recently developed, controversial bioethical dispute: cloning. The process of cloning is incredibly complex. Scientists remove the nucleus from a mammary cell and place it into an egg cell that has been removed of its DNA. The cell is then starved of nutrients, the nucleus and donor egg are fused with an electrical charge, and implanted into a surrogate mother (Leone, Biomedical 16).

When Ian Wilmut cloned Dolly the sheep in 1997, a tremendous uproar ensued. The National Bioethics Advisory Committee recommended a five-year moratorium on human cloning so that the technology and ethics of such an undertaking could further be studied (Leone, Biomedical 13). As this is such an enormous cultural and social topic, the pros and cons of today's cloning technology must be painstakingly considered. First, a look at the benefits of cloning.

Proponents of human cloning have several reasons for having the view they do. One justification for human cloning is what many deem spare parts. If doctors were able to harvest organs from patients in need, the organ shortage could be severely reduced. In addition, patients would no longer require taking medication their entire lives to avoid rejection of the new organ (Yount 90). Scientists could also grow hearts and livers from pigs that would be compatible to humans (Clone 10).

Another benefit of cloning is what it could do to the pharmaceutical industry. Drug companies will be able to clone proteins from animal milk for the treatment of hemophilia (Clone 10).

Japan has become notably progressive in its use of cloning technology. Japanese researchers have developed to prototypes of cloned cattle - ES1 and ES2. These cattle are only the beginning of Japan's venture into using advanced biotechnology to rouse its sluggish beef industry. Researchers in Japan have already perfected methods to clone potatoes, tomatoes, asparagus, orchids, and goldfish (Brave 12).

It has been said that to clone a human will strip away the very essence of humanity. This is not true, say some advocates of human cloning. Personality traits are a complicated interaction between many genes and the individual's unique environment. One cannot expect a gene to work how its label says (Leone, Biomedical 30).

Human cloning also occurs randomly in nature - with identical twins (Madigan et al.). Yet nobody argues that twins are not individuals and are mutations of nature. Even twins kept in the same room will react differently to various things. For clones, this would be even greater because of their divergence in years (Leone, Biomedical 48). No matter what you clone, you cannot clone two exact brains. The cloning of a human being would also end the argument over genetics or environment once and for all.

Senator Tom Harkin of Iowa is one of those who believe cloning research should be allowed to evolve without restriction. He states that those who would put an end to cloning should take your ranks alongside Pope Paul V, who in 1616 tried to stop Galileo (qtd. in Leone, Biomedical 14). Many would be inclined to agree with him, including a long list of influential American and international figures. This list includes such scholars and humanists as Sergei



Kapitz, chair of the Moscow Institute of Physics and Technology; Indumati Parikh, Indian reformer and activist; W. V. Quine, Professor Emeritus of Philosophy, Harvard; and Kurt Vonnegut, novelist (Madigan et al.) There is another serious side to this debate, which also deserves equal focus. The negative aspects of cloning also weigh heavily on many consciences. One argument is that in order to achieve one normal human specimen from cloning, a number of deformed or handicapped children will be produced. This theory is based on the fact that of 277 attempts to clone a sheep, only one acceptable copy was actualized (Leone, Biomedical 14).

Another fear is the suspicion that if we are able to change the genetic makeup of an organism and clone it, will someone, somewhere, attempt to clone an entire race of lower-caste, human slaves (Madigan et al.)? Or, looking at it from another angle, will it be possible to engineer and clone an entire generation of superior beings? Many conclude that that argument is inadmissible, because the concept of defining superiority through genetics is nearly impossible (Leone, Biomedical 30).

A quick glance at the list of those opposing the continuation of human cloning research reveals several world leaders, including President Bill Clinton of the United States, President Jacques Chirac of France, former Prime Minister John Major of Great Britain, and the Vatican in Rome (Madigan et al.) The Vatican in Rome. A commanding force to be reckoned with in the debate over moral and ethic issues. Numerous religions around the world have publicly announced their opinion of cloning; and, for the most part, they do not favor the practice. Dr. Abdulaziz Sachedina, an Islamic scholar at the University of Virginia, declared cloning to be in violation of Islamic teaching <https://assignbuster.com/as-our-technology-continues-to-advance-new-breakt-essay/>

about the family legacy and said that it eliminates the sanctioned role of fathers in procreating children (Madigan et al.). A recent conference of Roman Catholic bishops announced that cloning is intristically morally wrong, an attempt to play god, and it exceeds the limits of the delegated dominion given to the human race (qtd. in Madigan et al.). One Protestant scholar, Gilbert Meilander, said that cloning is immoral because the reason for the clone's existence would be grounded in our own will and desires (qtd. in Madigan et al.).

There are many reasons for the Church's hostility toward cloning; however, three prominent reasons emerge most often. The first of these is that cloning is an attempt to play god. Now this argument was also used against birth control, organ transplants and assisted deaths. Many proponents of cloning believe that religious leaders use this excuse anytime people attempt to control their own lives (Madigan et al.). This does not however, make it wrong or misleading. Should there be a barrier that determines how deep into human life scientists can go? The next widespread argument is that cloning is not natural. It has been said that cloning separates reproduction and intercourse (Madigan et al.). Religious leaders believe that conception should be a moral, loving act between a married couple.

Lastly, there is the theory that by cloning a human, we deny that person their uniqueness and dignity. By giving a cell a used set of genes, churches conclude, scientists are robbing that person of singularity and the right to be one-of-a-kind. There are two arguments to refute this. First, DNA, as well as environment, shapes one's personality (Madigan et al.) Also, the fact that clones can be found in nature on a regular basis, with identical twins.

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This violent debate between religion and science is not likely to end soon. The basic fact is, everyone must form their own set of morals and ethics. One's outlook determines the side one will take in such debates. It may be based on personal experience, religious beliefs, or occupation.

My personal philosophy is that if we, as a progressive society, ever hope to achieve the things that were once looked upon as lunatic science fiction, we must be willing to dig as deep as technology allows us. There are so many amazing new discoveries to be made, inside our bodies and out. This technology WILL be put to use by someone, whether for good or for evil. Why not use as much as possible now for society's benefit, before the science is forever barred? Let's get what we can out of it, instead of letting it get into the wrong hands. Franklin D. Roosevelt was right when he said