The Ethical Considerations Surrounding Genetic Modification

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Advancements in genetic technology show our shared genome indisputably connects all humans. This new technology creates increased genetic awareness, modification and engineering and thus generates novel ethical dilemmas. This rising technology forces us to define humanity. Technology can help us define human characteristics but we must each explore and decide for ourselves what human really means. Our society must agree upon what constitutes conventional human behavior and characteristics and together discover the most effective policies to draw clear lines between disease prevention and enhancement. We must not use genetic modification to simply enhance already healthy human beings consequently altering human nature. We can promote humankind by ethically pursuing only disease curing genetic research and modifications. Preserving all people's dignity and right to life remains crucial.

Genetic Technology Applications

The international research project entitled the Human Genome Project mapped the gene sequence written within all human DNA. The project completed in 2003 located about 20,000 human genes and simultaneously showed us the instruction manual for creating human life and sparked the gene therapy revolution. Hamdoun (2017) states our newfound understanding intricately laces together scientific discoveries, history and ethical questions. Our new genetic knowledge shows our common origins and possesses the capability to unite all mankind by inarguably proving all man equal and interrelated. Recent advancements especially, in CRISPR-Cas 9 genome editing coupled with increased information from the Human Genome Project, greatly broadens scientific and social possibilities while developing new cultural fears. Hamdoun (2017) states genome sequencing's power to advance quality of life and eradicate disease remains intricately entangled with the possibility of disrupting the delicate balance dictating all life. By meddling with the human genome sequence, we could alter normal human functioning turning the human race into unrecognizable manmade creatures and ultimately destroy our own inherent meaning and personal value. Prosperous societies always urge community action and involvement; these fundamental public values remain especially imperative now. We collectively march towards a new scientific paradigm and unprecedented human rights concerns, so we must progress mindful of technology's power and the immense social responsibility we each now possess.

Genetic Modification Procedures and Disease Prevention

Gene therapy inserts a corrective or better adapted gene into the host to treat genetically originating diseases. Genetic technology is not new; Schanker (2010) explains many different gene altering techniques are already relatively prevalent and accepted. Hormones and drugs affecting gene expression have been used for many years transforming treatment options for devastating diseases like Sickle Cell Anemia, Adrenoleukodystrophy and Leukemia. These gene altering medications are largely accepted and interestingly not often categorized as genetic enhancement though they result in genetic change. Bone marrow transplants utilize stem cells infused intravenously into the patient's body. The transplanted cells make new blood and bone marrow and also generate disease immunity. The stem cells can come from the patient's own body, umbilical cord blood or a donor. Stem cell transplants remain extremely effective and though stem cell technology possesses its own unique ethical questions, these procedures remain largely more socially accepted than other gene manipulating techniques.

Genetic modification and research encompasses many procedures and research avenues. Sivapatham (2015) emphasizes genetic modification's vastness. Prior tactics utilizing chemicals or radiation lacked control over where the intended gene mutations occurred within the patient. Sivapatham (2015) explains tools like Zinc Finger Nucleases, and Transcription Activator-like Effector Nucleases and CRISPR technology cause tremendously more effective gene mutations than previous methods. These new technologies all hold similarities. They each utilize nucleases to degrade DNA nucleotides. CRISPR-Cas 9 technology emerges at the forefront of biotechnology and genetic engineering thanks to its accuracy, ease and relatively lower cost; however, CRISPR-Cas 9 remains highly controversial. CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats and the suffix Cas 9 references the enzyme which cuts the DNA double helix to allow removal or addition of specific DNA sequences within the genome. A guide RNA molecule created by scientists' base pairs with the specific DNA sequence the scientists wish to modify while concurrently recruiting the Cas 9 enzyme cutting the targeted DNA strand. Cribbs (2017) explains the DNA breaks allow removal or changes within the specific DNA sequence to successfully "knock in" or "knock out" different gene expressions and potentially treat many different diseases and disabilities.

Genetic Disease Examples

Genetic research clearly impacts breast cancer diagnosis, treatments and outcomes. Researchers recently discovered BRCA 1 and BRCA 2 gene mutations predispose afflicted individuals to hereditary breast and ovarian cancer. The American Cancer Society estimates over 40,000 women will die from breast cancer in the United States alone making any breakthrough in disease prevention highly sought after and incredibly important. Hirotsu (2017) emphasizes genetic analyzation is very important in both preventing and making decisions regarding breast and ovarian cancer. New genetic technology allows women with a family history of breast cancer to undergo genetic testing determining if they carry the mutated BRCA 1 or BRCA 2 gene. This testing allows patients to make more informed decisions and ultimately leads to more effective preventative measures including earlier or more frequent mammograms and even mastectomies.

Bernhardt (2017) presents a case involving a 1 year old girl suffering from a gradually progressing motor neuron disease called Spinal Muscular Atrophy. Spinal Muscular Atrophy, SMA, is caused by a survival motor neuron (SMN) 1 gene and results in fatally low muscle tone eventually resulting in early childhood death. Berhardt (2017) argues the decisive action and genetic tests performed by medical professionals at the University of Minnesota Masonic Children's Hospital saved this young girl's life. A breakthrough new drug called Spiraza, administered by injection, changes the SMN2 gene allowing it to replace the mutated SMN1 function. This gene manipulation, though new and very expensive, saves this patient from irreversible muscle damage and ultimately death.

Genetic Modification and Ethical Dilemmas

Genetic modification can not only alter disease outcomes but could also fundamentally alter human kind. If left unchecked, population level genetic changes could ultimately confuse our sense of normal human functioning and blur the lines of ordinary human characteristics. Already our world is vastly more medicated than a few decades ago with more prescribed medicines and over diagnosis of common behavioral characteristics like hyperactivity. Widespread and easily accessible genetic engineering would only compound the crisis we already face. Posthuman and dystopian novels depict hardly recognizable societies. At its worst, I believe genetic modification could destroy the shared morals holding our society stable ultimately creating the divided and strictly ranked society Huxley (1932) depicted. I do not believe all genetic research and engineering must cease. I strongly feel genetic engineering also possesses the ability to make us a more moral and virtuous humankind because it forces our recognition and practice of ethical standards; genetic engineering could make moral behavior more common. Gardiner (2003) argues someone possessing strong moral convictions must habitually practice their chosen principles and genetic modification offers the human race an applicable avenue to not only develop but also strengthen our intrinsic ethical code.

Eugenics

I feel it is impossible to discuss genetic modification's potential applications without further understanding eugenics. Gillham (2001) documents how the renowned scientist Sir Francis Galton firmly believed selective breeding could alter the human race. Galton was very interested in topics regarding race cultivation and he coined the term "eugenics" in 1883. The broad term eugenics can be broken into two subgroups; positive and negative eugenics. Positive eugenics promotes breeding to produce desired heritable traits. Negative eugenics promotes restriction or sterilization of individuals lacking a desired characteristic. The organic process prompting evolution termed natural selection operates under a natural eugenic movement allowing species survival and adaptation. However, human dictated controlled breeding, otherwise known as eugenics, threatens human rights. Many people still remember and justifiably fear the negative eugenics used to promote horrendous behavior during World War II and many other times throughout history. Silva (2002) acknowledges negative eugenics' dangerous past and Cribbs (2017) points out how historically genetics and social engineering prove largely incompatible. I feel we must remember and acknowledge these callous past human offenses so we prevent eugenics' negative indoctrination and use our newfound genomic knowledge solely to advance humankind's collective wellbeing.

Decisions surrounding genetic modification justifiably prompts discussions about past eugenic practices and future discriminatory possibilities. Gene editing techniques pervading the medical field forces our immediate recognition regarding well intentioned medical procedures becoming eugenic driven genetic based societal genocides. Douthat (2018) argues we must acknowledge the fact our society shares some common characteristics with the past eugenicists our society today so readily condemns. Douthat (2018) argues our society is not very different than past eugenicists in terms of goals; both groups advocate social reform and optimistically dream about human advancement. He argues our society already engages in the careful reproductive planning associated with eugenics most obviously though common prenatal testing for Downs Syndrome where 9 out of 10 positive test results in a legal abortion. Douthat (2018) argues our expanding knowledge regarding genetic disease origins and increased genetic testing inevitably warrants a form of eugenics known as prenatal selection. My aim in this paper remains focused upon moral decision-making surrounding genetic modifications so I will not address the compounded ethical dilemmas created by aborting a child based upon genetic test results, however, it remains yet another critical moral determination pervading society entwined with increased genetic knowledge.

Gene Mutations

Medicinal practices naturally encounter ethical dilemmas because our individual human lives remain our most precious possessions. Gene editing compounds these dilemmas because we no longer must account only for our individual lives but we must acknowledge our direct impact on future lives. We must determine case by case what type of gene mutation would occur and the subsequent extended repercussions current actions facilitate. Simon (2002) explains gene transfers can occur in somatic cells yielding "temporary effects" affecting only the targeted cell and cells derived from the target cell. Somatic mutations alter only genes of the person being directly treated. Simon (2002) explains gene manipulation can also occur as germline mutations. Germline mutations create lasting generational effects occurring in every subsequent future offspring. By targeting a gamete cell (a sperm or egg cell) the induced genetic change occurs throughout the entire offspring's body because all cells originate from the first embryonic cell derived from the targeted gamete cell. This type of gene mutation possesses the capability to transmit the gene mutation to future generations because all cells of the subject contain the mutated DNA strand including the subject's own gametes.

Germline mutations offer clear benefits because they could cure an entire population of devastating genetic diseases such as Huntington's disease or Cystic Fibrosis in a small matter of generations. By altering the gene coding for the genetic disease embryonically, genetic engineering could eradicate the defective protein from future generations. However, when considering germline mutations as opposed to somatic personal genetic changes, the ethicality of manipulating human embryos becomes more confusing. By inducing genetic change upon future unborn generations, we begin predestining unborn lives. Sivapatham (2015) and many others argue genetically modifying human embryos inevitably leads to a eugenic driven population. We must also remain cognizant that all genetic disease cannot necessarily be eradicated through germline editing techniques. Ultimately spontaneous or induced DNA breakages and mutations propel species diversity and natural selection. Therefore, as we eradicate genetic diseases, new ones will inevitably present themselves leaving the afflicted person feeling even more isolated and with fewer resources than someone possessing the same mutation might feel today.

Viral Vectors

Cribbs (2017) sheds light on yet another controversial aspect of CRISPR-Cas 9 and other gene editing techniques; scientists use live viruses to enter the cell membranes and induce the desired genetic change. Every cell in our body contains the same DNA sequence yet our cells differentiate and fulfill different functions based upon which genes are expressed. Each of our cells has a semi-permeable cell membrane encapsulating the cell contents and the nucleus containing our DNA. The cell membrane protects our genome from potential mutagens and degradation. Because gene editing induces mutations upon our genome our cells do not readily accept the mutation causing factors; something must escort the nuclease, RNA template and other gene-editing elements into the cells. Retroviruses (the pathogen causing immunodeficiency syndrome) and adenoviruses (the pathogen causing the common cold) are common vehicles for nucleic acid instructions. These live viruses can fuse to the cell membrane and either fully enter the cell or allow injected passage past the cell membrane. Viral vector techniques, though risky, garner wide support because viruses can target and enter a cell very accurately.

Cribbs (2017) explains because the viral vectors are technically disease agents there remains potential secondary infection issues and subsequent side effects including cancer and immunogenicity. People undergoing genetic modification to treat a disease could react to the virus becoming seriously ill or even dying. Using potentially life-threating techniques seems less contentious when the genetic disease being treated is life threatening but using possibly harmful vectors becomes more controversial when considering people who could otherwise fully live their lives without any attempted genetic modification. Hamdoum (2017) states virosomes, which are scientifically combined liposomes and viral surface proteins, could prove advantageous alternatives because incorporating plasmids into the viruses leads to lowered secondary disease risk. Virosomes could decrease ethical drawbacks concerning disease introduction, however, their use generates different questions concerning introducing more synthetically engineered devices into the human body.

Genetically Modified Behavior

When considering the vast medical possibilities genetic modification generates we must also carefully contemplate this rising technology's impact upon medical practices involving mental health and behavioral conditions. Shamoo (2004) states over thirty million people in the United States suffer from some behavioral disorder; the sheer number of people afflicted by mental disease prompts advocacy in favor of gene altering intervention. Some feel our genetic material dictates all human behavior but this realization generates complicated moral questions. Asserting our biological makeup predetermines our behavior destroys all personal responsibility and accountability and thereby creates a totally ungovernable world. Undoubtedly our genes play key roles creating our personalities and characteristic tendencies, however, we must hold ourselves at least partially liable for our individual deeds. Genetic makeup might predispose someone toward aggressive or volatile behavior yet they individually must still exercise self-control and therefore be held responsible for any publically dangerous acts. Personally, or socially detrimental behavior does exist and some behavioral disorders are well defined, however, unless severely mentally or emotionally ill we still possess the ability to predominantly choose our behavior.

Shamoo (2004) argues several serious behavioral disorders exhibit genetic origins including schizophrenia, schizoaffective disorder and bipolar disorder. We must make countless ethical considerations for any medically promoted genetic modification, but proposing gene therapy to correct diseases with behavioral or mental manifestations compounds moral concerns. Shammo (2004) explains determining physical genetic abnormalities generate less confusion because normal physical variation within humans can be determined using anthropometric standards, however, these standards do not include behavioral variations. We struggle to define moral physical genetic modifications utilizing widely accepted anthropometric measurements so determining the ethicality of genetically changing behavior becomes vastly more confusing. Shamoo (2004) argues unique ethical challenges from behavioral genetic modifications arise because behavior modification can create cognition, intelligence and emotional changes directly affecting the individual’s social success or failure. We must approach genetically altering genes related to cognitive function even more cautiously because an individual’s behavior and mental state gives someone even more identity than physical traits.

Equality

Altering the specific nucleotide sequence coding for a genetic disease relies on first identifying the common mutation causing the disease expression. Modern science shows us our genes code for proteins through the processes of replication, transcription and translation. The coded proteins produce our resulting phenotype. In order to really understand what mutation is responsible for a particular disease widespread genetic testing and profiling must be conducted. Many ethical questions accompany this proposal. Chadwick (2001) states genetic registers already exist and help determine disease outbreak origins by tracking diseases like tuberculosis. The proposed genetic registers necessary for cultivating massive genetic databanks and eliminating genetic disease remain fundamentally different than current registers. Informed consent is the ethical principle governing medical practices; informed consent educates the patient and explains the purpose, benefits and potential problems of a proposed procedure. This process currently protects each patient's individual human rights and encompasses many ethical principles including record confidentiality and injury compensation. Greely (2001) explains massive genetic databases would make existing rules about patient informed consent insufficient because all humans would become research subjects. We must determine how to correctly mine genetic information from each individual. Greely (2001) offers group consent or presumed consent as potential solutions, however, he acknowledges the compounding ethical implications these proposals generate. Implementing protocol requiring administered genetic testing at birth seems most logical, however that proposition places the informed consent decision upon parents or legal guardians ultimately taking away the patient's right to decide whether or not they want to take part of something not personally medically necessary.

Generating a large genetic database also presents ethical issues revolving around disease discrimination. Making a large genetic databank categorizing groups sharing genetic differences is essentially profiling. If left unchecked, genetic profiling could detrimentally characterize whole groups. Juengst (2016) argues we risk reaffirming old prejudices or creating a more discriminatory society. Genetic discrimination might arise if people begin equating a particular race with a particular disease ultimately reverting back to a pre-civil rights society with genetic laws similar to the 1960's inhuman anti-miscegenation laws. No humane person desires the world Huxley (1932) depicted showing a society based upon completely divided societal goals and predetermined human existences. Humans must remain free and equal. The sheer quantity of genetic material necessary to create a genetic database generates its own ethical conundrum. Olson (2017) argues large information technology companies are the only entities large enough to manage the immense data required to create effective genetic databanks. This fact creates issues because all people should have access to the compiled lifesaving data. We cannot afford a large company to obtain a monopoly on our own humanity. Olson (2017) explains a U.S. supreme court decision already bans patents on large sequences of the human genome because all people should be guaranteed access to our genome. Our DNA sequence instructs our lives; a large databank could only be created through testing the overall population therefore constituting another reason each person should have guaranteed access to the compiled information.

Genetic engineering with the sole purpose to overcome nature is fundamentally wrong and destructive. Brassington (2010) argues advancing genetic technologies lets humans bypass natural selection's time-consuming process. Gene editing can cause large population level change within just a few generations. Brassington (2010) also argues we may fundamentally alter humanity by overly selecting traits. Natural selection works upon environmental factors to evolve better adapted species. As the environment changes those within a population carrying an advantageous trait live longer and reproduce more successfully eventually passing the trait through the population. We must not disrupt this intricate process. Advancing natural selection's rate nullifies the process and destroy its core organic nature. Simply because we possess the ability to change population traits does not mean we should. Even with our advanced technology humans do not know exactly how the environment might change. Interfering with natural selection and supposing we can dictate nature remains very dangerous. Instead of selecting desirable traits we could ultimately create a population with attractive physical or mental features yet totally unequipped and unable to survive our changing world.

Ethical Approaches and Concerns

Human Bioethics in Medicine

University of Wisconsin Professor Van Rensselear Potter first coined the term bioethics in 1971 but I believe the human race has always operated under basic bioethical principles. Our shared humanity causes most humans to choose just and mutually beneficial actions over socially detrimental behaviors . Most medical practices are extensions of this ingrained value system because medical practices can exacerbate human vulnerability and therefore necessitate patient protection and humane treatment. Medical practices transpire under the assumption of shared human dignity so all medicine should, at least in theory, promote our shared humanity. The medical field is composed of humans working to heal other human lives and therefore medicine as a whole respects human life and acknowledges each lives' intrinsic value.

Our shared humanity engrains ethics into medicine. Each day medical professionals encounter countless moral dilemmas and ethical consultants help facilitate shared decision making between caregivers and family members promoting human dignity and human rights. Fanning (2015) explains ethical consultants remain particularly useful in situations involving life support and end of life care. Coupled with other medical professional's advice, ethical consultants help family members decide appropriate actions and humane treatment options. Genetic testing and genetic engineering prove medical practices needing ethical supervision and guidance. We must remain aware the new technology possesses threats; Silva (2002) calls to question how many tests a future baby may need to pass before being accepted because current technology already allows embryonic disease screenings for diseases like Down Syndrome. Future parents will undoubtedly have even more information about their unborn child making ethical consultants even more necessary.

Dupras (2014) defines bioethics as how ecology, medicine and human values all relate; this definition indisputably proves we need multidisciplinary collaboration to create ethical gene editing standards. Alone doctors, politicians, theologians or business professionals cannot create the most effective and moral directives because alone no one person can possibly understand all consequences nor can one individual group investigate all future gene editing applications. The issues surrounding genetic modification require full community participation. Because genetic modification can affect all people we must acknowledge all people's intuition regarding the matter. We must recognize shared values and promote cooperation between all people. Before solidifying regulation, we must first seek harmony between these important human aspects. Sivapatham (2015) argues we already coexist alongside other highly controversial topics including nuclear power plants which proves we can find a way to incorporate genetic modification into society. Sivaptham (2015) emphasizes creating international guidelines surrounding genetic modification may prove difficult because individual human ethics do undoubtedly vary yet regulation remain necessary. The Human Genome Project simply coming to fruition proves differing associations can unite to generate important agreements. Our humanity and mortality unites us, yet, our many different motives remain divergent and unfortunately often divisive. We must unite together under shared values and our shared genome rather than focus upon insignificant discrepancies.

Determining Ethical Standards

Genetic modification offers vast possibilities for growth and destruction. We are left wondering how to obtain genetic modification's benefits without destroying our fundamental human existence. We search to find common ground and a way to obtain consensual direction. The great philosopher Aristotle offers insight into how we might build our common morality and practice promoting the common good. Aristotle believed virtue lay between two vices. One example being courage lay between cowardice and foolhardiness. I believe employing Aristotle's philosophy can help us draw a strict line in the sand so genetic modification does not negatively alter humankind. We can pinpoint moral conclusions by first locating unethical practices. Gardiner (2003) argues justice, compassion and profound contemplation must prevail.

Scully (2001) proposes we use reverse ethics to determine each individual procedure's ethicality. Reverse ethics is effective because it works backward first finding commonly accepted boundaries and from that accepted point determining the boundaries' origins. Scully (2001) and many others believe moral boundaries develop from shared community interests and using the reverse ethics approach facilitates community while recognizing the strength of collective human decision making. Reverse ethics promotes discussion and the fundamental idea that all people hold value. I feel reverse ethics could solve the issue surrounding the genetic engineering and creation of designer babies. Designer babies are embryos selected for their specific DNA before implantation into the womb. I think most people feel at least some discomfort about being given the opportunity to choose their child's eye color or other physical traits. We must acknowledge and listen to this consensual feeling and not desensitize ourselves to our own moral convictions. Once the technology to select children's physical traits becomes prevalent there would exist no way to stop its momentum because people would not want to disadvantage their own children. Utilizing reverse ethics could create boundaries before designer babies become commonplace. Reverse ethics offers a unique perspective but the major flaw I see is that it cannot be utilized for procedures that have not already been created. Reverse ethics must be coupled with something more to combat future human rights violations.

Religion's Role

Herzfeld (2009) proposes we let religion help determine ethical standards. Volitionally or subconsciously many people's decision-making processes intricately involve religious viewpoints. Some feel religious applications are irrelevant and ill-equipped to address decisions regarding genetic modification. These people feel religion and science necessarily oppose each other. Francis Collins, founder of the Human Genome Project, directly rejects this proposal. Collins (2006) argues belief in God remains entirely rational. He feels principles of faith and science complement each other. Many scientists and the greater population demand proof that God exists. Scientific discoveries have proved everything else's existence so some people reason science should also be able to prove or disprove the existence of a greater outside force. This thought process causes many to develop an agnostic viewpoint of neither belief nor belief in a higher power. Collins (2006) counters this argument arguing agnosticism often proves to be a cop out. Collins (2006) argues should a god exist he must exist beyond our natural world so scientific earthly tools could provide only insufficient proof. Faith in a greater good and in the human race must ultimately form our decision and guide our subsequent actions.

Religious principles can complement the reverse ethic's approach Scully (2001) proposes. He argues shared community interests help develop accepted moral boundaries and Herzfeld (2009) states religions most often develop from shared community interest, therefore, rendering the two approaches congruent. Religion offers an avenue to determine ethical proceedings because it remains a root source of culture and value. Though many different religions exist throughout the world most share many central principles thus proving collective moral existence and providing yet more proof of our shared solidarity. Lewis (1952) argues the existence of moral law. He claims the human species universally acknowledges both ethically correct and morally wrong behaviors exist, yet our free will causes us to break the universal moral law with astounding regularity and therefore produces countless different societal and personal outcomes. Collective inherent moral conduct fundamentally holds the human race together. In our current world, individual community principles may vary but some actions remain inherently immoral.

Because most religions share common innate human ethical standards we can collectively create moral guidelines for genetic modification by interpreting established religious standings. Taylor (2012) states the Catholic church believes a clear distinction lies between gene therapy curing devastating diseases and immoral genetic enhancement. Taylor (2012) argues the Catholic church supports gene therapy returning a patient's normal human functioning because humans are called to heal the sick. However, the Catholic church feels genetic enhancement is morally wrong. Genetic enhancement intentionally alters human beings in ways not possible by nature and unintended by God. Al-Hayani (2007) echoes these sentiments from an Islamic perspective. Al-Hayani (2007) states we must address any creation altering technology with the utmost care. He argues religious-ethical communities must operate as society's conscious and he stresses the importance of finding a way to benefit all mankind equally. Al-Hayani (2007) asserts that Muslims must connect ethical faith based actions and scientific knowledge. Our increased understanding and capabilities creates societal responsibility and for many a religious duty to better humankind while preventing evil.

Our Human Responsibility

We cannot use old practices to determine the ethicality of new procedures. Old standards do not adequately equip or educate us regarding correct action involving advanced technology. Scully (2001) argues medicine inherently involves crossing many normally un-crossable social boundaries so we must be vigilant to execute proper moral actions while acknowledging patient vulnerability. McCormick (1972) argues we must err on the side of conservationism because promoting a safe idea inevitably paves the way for riskier and more ethically questionable procedures. We must weigh genetic modification's many desirable facets synchronously with personal and social costs. We cannot approach the compounding moral issues surrounding genetic modification by simply looking at what might result in seemingly the greatest good for the greatest number of people. Things like machine-man hybrids may seem to enhance community welfare therefore making their integration justified under the greatest good assumption. However, this type of technology could devastate human life changing our basic nature and thus proving machine-man hybrids ethically wrong by the same standard measurement. We must approach genetic modification differently because it is fundamentally different and more confusing than any other ethical dilemma society has faced before. Genetic modification can change future generations and affect our very identity more than any other previous invention.

Harris (2010) argues current and future technology gives the human race a duty and the power to create desirable characteristics within the human population. He and many others believe all enhancement is good because by definition enhancement means improvement. Harris (2010) argues if enhancements were bad people would not call them enhancements. Harris (2010) argues human enhancements already fill our world. We seem used to current human enhancements like eyeglasses and collectively do not feel threatened so we accept the enhancements. Fukuyama (2002) states the unknown feels threatening. Advancing biotechnology like genetic engineering incites fear because we dread disrupting any unity and continuity our species possesses. Despite widespread fear, some people like Harris (2010) remain confident all genetic modification is an absolute good because our human morals mandate improving life. Harris (2010) argues a concerning and scary approach. He feels anything that potentially improves life constitutes morality and ethical decision making. Blindly bounding into widespread genetic profiling and subsequent genetic engineering risks fundamentally altering human nature and ultimately destroying society.

Conclusions

Genetic modification could cure many life-threatening diseases and improve many people's quality of life. Genetic modification could also potentially alter our understanding of humanity. Shamoo (2004) argues we cannot predict genetic modification's full impact so it not only challenges us but should also humble humankind. Society must remain ever aware of the delicate and difficult balance between improvement and destruction. The human species must advance technology so we do not stagnate but we must also protect our dignity. We possess a duty to alleviate our fellow human begins suffering yet we must preserve our shared humanity. Our shared humanity is what holds society together. Genetic modification runs a slippery slope because the definition of normal can change. There exists a very fine yet to be defined line between what can be considered normal and what is considered enhancement.

Before genetic engineering can be put to good use we must first collectively develop criteria and essentially draw a clear line in the sand to ensure our humanity's longevity. Hamdoun (2017) argues genome sequencing presents both revolutionary understanding and unprecedented potential; we must collectively work to maximize potential societal profit while minimizing detrimental human wide repercussions. Genetic modification potentially benefits society and should not be regarded as an absolute evil; moreover, genetic modification cannot be regarded as absolutely good. Many genetic modification techniques and practices remain extremely controversial. Most long-term effects remain unimaginable. Despite its many drawbacks I still believe genetic modification has the potential to be a great instrument of humankind. Our society possesses a great responsibility to use genetic modification to strengthen human dignity and the civil rights of all people. Parker (2015) argues our incredibly divided world still shares some values, practices and commitments regarding ethical decision making. I believe keeping our shared humanity in mind is imperative as we venture to distinguish a clear line defining enhanced versus conventional human nature. Progress is necessary, but we must also not get so caught up in the future that we are blind to the present or forget the past.

Genetic modification and research to cure diseases remains both a moral and ethical act promoting humankind. Advancing medical care and treatment benefits the entire human population. Using genetic modification to simply enhance already healthy humans being is morally wrong and decreases each subject's natural human dignity. All genetic modification done without the intent to cure disease goes against human nature and threatens our shared humanity. Foresight and self-control remain imperative. We must reach consensus regarding normal human behavior and characteristics. Before further advancements can reach their lifesaving potential we must determine a framework distinguishing between enhancement and disease prevention. This societal issue demands careful regulation and society wide participation to keep ourselves and future generations safe.

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