Human Genetic Engineering: Should We Design The Future

Throughout history, humans have continuously sought greater knowledge about themselves and the world. The evolving world of science can answer various questions, while subsequently producing multiple new ones. The recent capability to manipulate genetic material is a substantial and revolutionary advancement in the course of human and scientific knowledge. However, it also disturbs concepts that were once fixed and comfortable and provokes both excitement and concerns. Although genetic engineering may provide certain benefits to the human race, by conceivably limiting flaws and preventing health conditions, it presents far too many moral and ethical issues, as well as unknown dangers, to be put into use.

Beginning in the late 20th and early 21st century, scientists developed techniques of germline genetic modification, known as genome or gene editing. The technique which generated the most excitement, due to its seeming capability and ease of use, is called “CRISPR;” clustered regularly interspaced short palindromic repeats. The basis of CRISPR technology was intended to prevent and treat human diseases, but scientists have now taken components of the CRISPR system and transformed it into a mechanism for gene editing and human genetic engineering (“Genetic Modification, Genome Editing, and CRISPR”). The use of CRISPR, for this reason, is highly debatable. As mentioned by the Center for Genetics and Society, “for safety, ethical, and social reasons, there is broad agreement among many scientists, ethicists, policymakers, and the public that germline editing is a red line that should not be crossed” (“Human Genetic Modification”). It has provoked worldwide discussion and debate about whether germline genetic modification in humans is appropriate, and whether or how society should proceed with such research and possible application.

Critics of CRISPR and human genetic engineering stress both the technical and ethical issues it presents by making changes and adverse effects to the genome that can be passed down to offspring. Other questions are being asked… “Do we have the right to alter the genome of our future generations? Would the editing of certain diseases or disabilities lead to stigmatization of people who are living with those conditions? And who gets to decide what are considered diseases or disabilities that should be edited?” (“Human Genetic Modification”) Alternatively, people who advocate for genetic engineering argue that germline modification can potentially eliminate diseases caused by a single gene variant, such as Huntington’s disease. Gene editing may have considerable potential to benefit human health, but simultaneously, it raises serious questions that require public deliberation:

“What if we make alterations we regret? What if seemingly safe genetic changes prove to have unintended consequences? What are the standards for safety as the medical community seeks to explore these tools in an effort to diminish suffering? Additionally, if as a society we agree that the use of genome editing is acceptable, how do we ensure that all individuals are aware of the potentials of these technologies, and that everyone who wants to access such technologies can afford them?” (“Human Genetic Modification”).

Based on the aggregation of ethical and safety concerns that human genetic engineering raises, it remains illegal in many countries.

The concept of genetic engineering of humans raises many moral challenges and arguments. According to Reilly, “anyone who values the miracle and dignity of human nature should be alarmed that researchers are hastily developing therapies that will alter the DNA of unborn human beings---radically, unpredictably, and irreversibly.” (31) In many ways, the argument against human genetic engineering of unborn children parallels to the pro-life abortion argument. Opponents argue that human genetic engineering is “wrong because humans not yet born at the time of research had not given their informed consent to risk their own genome.” (Evans 11) Pro-life Americans argue that killing an innocent human person through abortion is wrong because a fetus is a potential life that will, in most cases, develop into a fully functional human being. Since the fetus is unborn, it does not have a say in whether it is aborted or not. Just as pro-life Americans preach that killing a person through abortion is wrong, it must also be taught that respect for human life demands unconditional respect for the human nature through which that life is expressed. The genetic engineering of unborn human beings speaks to the parents and scientists who put their own preferences for normality, abilies, and competitive achievement above the respect for the miracle of human nature. (Reilly 31) Even if technological shortcomings of human genetic engineering may be overcome with increasing knowledge and technology, the ethical controversy regarding “designer babies” will always remain (Chen 534). Human genetic engineering of unborn children connects with the idea of eugenics, or systematically applying genetic selection to improve the human population by increasing desirable human characteristics. There is controversy surrounding ethics that involves the ambiguity between “negative” and “positive” characteristics. Depending on each person’s subjective view, what may be considered an unacceptable, negative characteristic to one person may be a positive, acceptable one to another. (Chen 534-535) Ultimately, it is important to alert others to the devastation that comes from giving such power to scientific reason and technology in both genetic engineering and our society at large. As Reilly concludes, “it’s the human thing to do.” (36)

Perhaps the more convincing argument against human genetic engineering is the determinantal medical effects that are bound to accompany it, as well as unknown dangers. Yang and Wang point out the recklessness of human genetic engineering with the example of the work of Jiankui He. In November 2018, He, a Chinese biophysics researcher, presented his gene editing project that led to the birth of two baby girls with man-made genetic mutations, specifically the C-C chemokine receptor type 5 (CCR5) mutation. He believed that this genetic modification would grant the babies immunity to HIV infection. However, He’s extremely irresponsible behavior caught the attention and violated ethical consensus of scientists across the world, based on the lack of basic medical ethics and understanding of genetics. Foremost, He’s overall rationale was criticized, and it was denoted that gene editing in embryos is completely unnecessary to prevent HIV transmission to the fetus. Thus, editing the early embryos did not provide any benefits to the babies, while posing potentially serious risks. Yang and Wang go on to stress “we believe there is no sound scientific reason to perform this type of human gene editing on the human germline, and that the behavior of He and his team represents a gross violation of both the Chinese regulations and the consensus reached by the international science community.” (4) Furthermore, they propose a solution: “After reaching a clear consensus, clear and strict laws need to be passed, implemented, and enforced as an international level...improved technologies may provide solutions for genetic diseases---but only when consensus has been met and a regulatory framework has been put in place for treating specific medical implications.” (4) Ideally, the government would put an end to human genetic engineering research until the technology is better understood and developed. However, as evidenced by international research such as He’s experiment, the rest of the world will not wait

for the United States to catch up. As a solution, the United States should apply strict regulatory guidelines, preventing the government from allowing the production of designer babies or “Frankenstein horror dreaded by many.” (Chen 548)

In conclusion, the subject of human genetic engineering causes a multitude of ethical dilemmas, along with questions about unknown medical risks as a consequence of the process. The action of gene editing through genetic engineering significant runs into resistance and controversy both in the United States and worldwide; it is a controversial, but unavoidable issue facing our society today. On one hand, the technology has the potential to cure genetic diseases, but on the other, rearranging human DNA to a person’s liking could have unthinkable consequences. Human genetic engineering should be prevented and disallowed because it allows scientists and parents both to “play God,” and as a result, takes away the beauty of human nature. In conjunction with the moral problems it elevates, genetic engineering can also result in adverse and irreversible effects on the child in question. If we fail to address these issues regarding genetic engineering, and put the practice into popular use, domineering science and technology will continue to spiral out of control and the results could be detrimental to our society.