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Ethics Reflection Paper: Ethics of Genetic Engineering

The last few decades of genetics and genetic analysis has moved faster than Moore’s law would have predicted with new techniques, cheaper reagents, and analysis. In this advent of the quick growth and innovation, the ethics of genetic screening and genetic manipulation have come into the mainstream consensuses. Previous thought experiments in science fiction depicted a world where the parents, or donors of genetic material, were able to manipulate the very fabric of their offspring by choice, or by force, by some large government entity. One of the best examples of this is in the book ‘The Naked Sun’ by Issac Asimov where the protagonist visits a planet that has a tightly controlled population where only the best and fittest are allowed to survive while those which are sub par have their genetic code manipulated in order to fit what the society deemed as appropriate. This is a fictitious example, but it parallels the school of thought that was pervasive during the first few decades of the 20th century where the natural process of genetic recombination and fertilization were wished to be controlled for eugenics purposes. As the science progresses, and the ability to manipulate genomic DNA in both humans and other organisms becomes more advanced, us scientists must be aware of the ethical limitations of what we are doing and have detailed talks about how we would wish to move forward with this technology – and to prevent the historical examples of control of the populace by technology.

The idea of manipulating the phenotypes of our offspring is not a new school of thought, but has its roots in eugenics and authoritarian ideals of what the best human should be based upon racist idealism. Many persons today do not see the use of genetic manipulation in the sense of creating a perfect race, but a way to modify the genetic code of their offspring in order to prevent genetic defects and diseases which can severely cripple a persons life. As talked about by the group presenting on Genetic Engineering, the initial application of Crispr Cas9 technology to treat these genetic disorders is becoming more feasible (Slaymaker et al 2016) and that there are already examples of successful genomic manipulation of human genomes (Shalem et al 2014). Knowing this we must question the ethical validity of manipulating our offspring genomic data without their prior consent, and how these types of treatment will cause an economic divide between those persons who can afford the treatment and those who cannot. We will have to also decide what is a proper case for treatment (such as Sickle-Cell Anemia) and if cosmetic, and attribute focused, genetic changes are appropriate to conduct. This becomes even more troubling as personal genetic testing is becoming affordable to the average consumer; these types of tests are marketed to tell the consumer what part of their genome is responsible (or partially responsible) for various disease and susceptibilities. It gives a false sense of knowledge about their genome, but it is also troubling because the companies themselves own the rights to their consumers genetic information (Baudhuin 2014). Alongside the human-centric application of genetic manipulation, the application has extended to other avenues such as pest control.

Mosquito are not only one of the biggest summertime pests, but also a deadly vector in many third world countries where they carry various blood borne pathogens and deadly disease which claim the lives of many adults and children alike. In a paper put forward by Hammond and their assoiciates they propose using a Crispr Cas9 perpetuating gene drive system which would systematically spread throughout populations of mosqitoes and induce infertility (Hammon et al 2016). While it is a noble idea to rid areas of a disease vector which could save lives, it is not a perfect fix and may end in unthinkable consequences to the ecosystem they inhabit. There are generally untold consequences to the removal of a species form an eco system even if there is no evidence of its purpose or what it helps. While it is ethical to rid the world of a deadly pest which majorily affects the poorest humans in the world, it may not be ethically viable due to the unforseen consequences which may lead to bigger issues in the span of the biota.

As we, as graduate students of this generation who study genetics in any capacity, move forward with our career to make new discoveries to add to the ever growing mountain of scientific discoveries we must keep in mind the ethical and moral impact of our discoveries. In many ways, this subject seems more like a govermental issue that will have to be decided by the peoples of the country, but we still have a duty to speak up and give our opinion on the use of these techniques – because this is still the world we live in.

References

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