

Human Genetic Modification

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With the advances in DNA sequencing, genetically modified organisms have become common practice among agricultural industries; similar technology could feasibly be used to create genetically modified humans. Clinical trials have shown that human gene transfer is not only possible, but can provide insights into human biology and arouse biologic responses relevant to human disease (Crystal 1). The techniques, based on mitochondrial manipulation, would change every cell in the bodies of newborn human babies and the alterations would be passed onto future generations (Darnovsky 1). While the prospect of changing genetic diseases sounds appealing, possible mistakes in the process would affect not only the generation modified, but all their offspring as well. The issue discussed among researchers and policy makers regards whether the “tools of human genetic engineering” should only be used to treat medical conditions in adults and children and not to modify sperm, eggs, or embryos; the question regards where to draw the line regarding human experimentation and high-tech eugenics (Darnovsky 1).

One form of genetic modification, called somatic cell treatment, involves editing single gene mutations (Capron 26). Single gene mutations are responsible for over two thousand human disorders, and are theoretically treatable simply by editing adult gene sequences (Capron 26). The technique involves first identifying a subpopulation of cells that are causing the issue, removing some or all of these cells, genetically altering the genes, then finally reinserting the cells into the patient (Capron 26). While this technique would seem to work, cells not removed from the patient could still propagate and potentially cause the disease in question to avoid its extinguishment; the only solid solution to this issue is the much more ethically questionable solution of editing the cells in the zygotic stage of embryonic development (Capron 27).

Editing the genetic sequence of an embryo raises many more ethical questions than editing adult genes; it stimulates questions regarding consent, intergenerational responsibilities, the distribution of social benefits, and the conception of what a human is (Capron 28). An individual cannot choose whether it wishes to receive genetic modification from the womb, when the individual is comprised of only a few cells. Due to this issue of error in the procedure as well as a lack of complete understanding of the effects of genetic modification, the individual being modified may receive adverse effects in regard to the modification; this is a risk the individual may not wish to receive. The question of intergenerational responsibility asks if one generation has the ability to eradicate a genetic disease, is it their responsibility to do so? The ability to detect genetic defects in unborn children has already presented the option to terminate a pregnancy and try again; seemingly this gene modification technology could be the lesser evil in this regard (Capron 29). The distribution of social benefits with regard to this technology asks if this technology is sufficient to fix genetic diseases, how is it distributed and who deserves it (Capron 30). Finally, genetic modification may raise the question in the modified individual of what is their “true self” and what is a result of the genetic modification, regardless of how large or small the modification was (Capron 31).

Any advancement in technology brings with it a new series of ethical questions on how it should be used, and genetic modification is certainly no different. Most of these issues deal with the idea of consent with an unborn modified individual, since they cannot answer the questions or ponder the consequences, they cannot give consent to literally life altering methods. Still, these techniques offer enticing rewards such as the

elimination of genetic disease. The final verdict is yet to be decided regarding the extent of human genetic modification.

Works Cited

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