CRISPR Conundrum

Recent scientific innovations like CRISPR-Cas9 gene-editing technology have made it possible to treat diseases connected to genetic mutations by pinpointing the defective genetic material and splicing in healthy genetic code. For example, by "editing" a patient's blood stem cells to create healthy red blood cells, researchers have been able to successfully treat sickle cell anemia in research trials. This type of somatic gene editing affects only targeted cells within the patient's body and cannot be passed on to offspring. CRISPR also has promising applications for treating muscular dystrophy, blindness, AIDS, and cystic fibrosis.[1]

Another type of gene editing affects the germline (reproductive) cells and is highly controversial. Germline gene editing involves altering the genome of a human embryo in its early stages such that changes are copied in other cells of the body and may be inherited by offspring. In 2018, a Chinese researcher named He Jiankui reported that he had edited the genes of two human embryos to prevent them from contracting AIDS from the father. The embryos were brought to term. His experiment was widely condemned by the scientific community for taking unnecessary risks and disregarding norms of research and ethical standards. Eighteen months later, Jiankui was arrested and sentenced to three years in prison.

Critics of gene editing argue that scientists should not be allowed to "play God" by altering the human genetic code. Human nature should be respected and preserved as it is, they maintain. Some point to the dystopian prospect of gene editing being used to create "designer babies" whose genetic advantages (for example, enhanced height, memory, or immune response) will translate into social and economic dominance of the rich over the poor. Others claim that parents selecting desired traits for their children is an act of hubris that destroys the mystery of conception and undermines the natural parent-child relationship.

Supporters of the new technology argue that both somatic and germline gene editing serve essential medical and social purposes and, despite certain risks, should be pursued for their potential benefits: the treatment of disease, the enhancement of human capabilities, and, eventually, the eradication of known genetic disorders. They maintain that one unfortunate experiment by a rogue scientist (Jiankui) should not be used as grounds to curtail all germline gene-editing research.

"The power to control our species' genetic future is awesome and terrifying," writes CRISPR co-inventor Jennifer Doudna. "Deciding how to handle it may be the biggest challenge we have ever faced."[2]

DISCUSSION QUESTIONS

1. Should scientists be permitted to alter the human genome? Under what circumstances is it morally permissible or impermissible to do so?
2. Is there a moral difference between using gene editing technology to enhance human capabilities (for example, to increase athletic performance or life expectancy) and using it to cure disease?
3. Should the fact that our biological attributes are "natural" influence the morality of whether or not it is acceptable or desirable to change them?
4. Who should make decisions about the permissibility of germline gene editing?

[1] https://theobserver-qiaa.org/crispr-cas-9-and-the-genome-is-it-ethical
[2] Jennifer Doudna, *A Crack in Creation: Gene Editing and the Unthinkable Power to Control Evolution.*