Designing Babies: A Eugenics Race with China?

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The rapid pace of genetic research, the author argues, guarantees that we will see genetically manufactured babies before the end of the century.

1 Human eugenics - the science that deals with improvements in hereditary qualities of a race - and the creation of genetically engineered advanced humans are probably inevitable. Granted, such a bald statement flies in the face of certain U.S. laws and most bioethical thinking, but within the next two decades, we will likely see human beings born with enhanced genetic characteristics in China, and competitive nations such as the United States are unlikely to allow a "smart-baby gap" to emerge. Many Americans will overcome their misgivings and support efforts to keep up in this new realm of international competition. The time has come to ask two questions: What is the potential of genetic engineering, and why is China predisposed to adapting genetic engineering to human enhancement?

Achievements in Genetic Engineering

2 The discovery of the structure of DNA in 1953 eventually led biochemists Herbert Boyer and Stanley Cohen to develop the techniques of genetic engineering in the early 1970s. Recognizing the extraordinary power and potential danger of this new technology, scientists agreed to a temporary moratorium on further research until guidelines could be developed to minimize the risk of a genetically engineered organism accidentally escaping into the wild. But biotechnology continued to advance rapidly when the moratorium ended just a year later. Today, many historians and prognosticators believe that biology and biotechnology may be the queen of twenty-first-century science just as physics and quantum mechanics were the queens of twentieth-century science.

3 When microbiologist Ananda Mohan Chakrabarty, an employee of General Electric, developed an oil-eating bacterium for possible use in cleaning up oil spills in 1971, the company applied for a patent on it that same year. What followed was a controversial landmark 1980 decision by the U.S. Supreme Court that permitted life created in a laboratory to be patented. In 1988, the U.S. Patent Office took the next step by granting a patent on a transgenic mouse developed at Harvard University that had been altered to make the animal susceptible to breast cancer. Since then, mice have been altered to be susceptible to other diseases so that new medicines and vaccines can be tested before use on humans.

4 The 1990s saw experiments in gene-transfer therapy, where a gene is introduced into a patient (often via a virus) because the patient either lacks that gene or his copy of that gene does not function properly. Gene therapy may prove effective in treating diseases such as cystic fibrosis or Huntington's disease, which have a strong genetic component. Ultimately, gene therapy could be used to permanently alter a person's body so that it regularly creates any protein or enzyme that had previously been lacking.

5 The international Human Genome Project, launched in 1990 and completed in 2003, provided a completed sequence of 3.1 billion gene pairs making up 35,000 to 40,000 human genes. Researchers around the world are trying to understand what each of these genes actually does, especially in combination with other genes.

6 The biotechnology industry, based on genetic engineering, reached $91 billion in revenue in 2004, with more than three-fourths of that research activity headquartered in the United States. Scientists have already made "designer babies" through the use of pre-implantation genetic diagnosis, where embryos still in the test tube are checked for genetic diseases such as Down's syndrome, Tay-Sachs disease, cystic fibrosis, or sickle-cell disease. This technique has also been used to check for immunological compatibility when parents are trying to have another child in order to save an existing child in need of a bone-marrow donation.

Future Expectations

7 In the future, genetic engineering will eventually allow us to design children in a test tube, but that goal will be reached through a series of efforts aimed at more modest improvements. At first, the designs will just use probabilities, banking on knowledge of which genetic combinations are usually found in more intelligent people, or which genetic combinations might make the blood more efficient in transporting oxygen and thus increasing physical endurance. As our understanding of the human genome increases and our crude genetic-engineering techniques become more sophisticated and precise, we will be able to make ever finer changes in humans. These changes may come in the test tube by manipulating a fertilized egg. They may be changes to a fetus in the womb. They may even be changes in the genome of children or adults. The earlier the changes are made, the easier and more dramatic their consequences.

8 So far, most genetic engineering has taken place in the United States and other industrialized countries, but that is changing. The study of genetics came to China in the 1920s. After the communists took power, however, genetics work was stifled, much as it was in the Soviet Union. The excesses of the Cultural Revolution in China permitted little scientific exploration.

9 Since 1978, with the end of the Cultural Revolution and the opening of China to vigorous economic expansion under the tutelage of the Communist party, the study of genetics has thrived. China is also pouring large sums of capital into developing its universities into more productive research centers. According to statistics released from the Chinese government,

research and development expenditures in areas such as genetic and genomic research totaled about $18 billion, roughly 1.3% of China's GDP ($1.4 trillion in U.S. dollars). It is not unreasonable to assume that in the next two decades China will become an important scientific player on the world stage, with world-class genetic engineering facilities and scientists and technicians to staff them.

Bioethical Discrepancies

10 Bioethics has always been implicitly present in the practice of medicine and medical research, and it has now grown into an important academic discipline. The first institute to study bioethics, the Hastings Center of Garrison, New York, was founded in 1969. Medical schools now often include bioethics in their curricula. Bioethics has become more prominent in China in recent years, with newly minted academic programs on the subject, but the Chinese approach focuses more on what is best for society at large than on the more common ideal in the West of individual autonomy.

11 One bioethical dilemma deals with designing babies. Most parents seek to give their children every possible advantage, such as sending them to the right school or arranging for specialized care and training. But in the near future, genetic engineering will allow parents to give their children an even greater edge. According to bioethics researchers in China, such as Qiu Renzong of the Chinese Academy of Social Sciences in Beijing, Chinese bioethical principles draw on traditional Confucianism to bring the family into medical decisions, not just the doctor and patient. Since Confucianism teaches that life begins at birth rather than conception, Qiu argues, the Chinese have no moral qualms against abortions, which are a major form of birth control.

12 In 1995, China passed the Maternal and Infant Health Law, which required medical doctors to conduct prenatal testing and to advise couples with genetic diseases either to not marry or to consider sterilization. In cases where the couple has already conceived and genetic abnormalities in the fetus are suspected, the doctor is to advise abortion. While the law only compelled doctors to offer advice, not to compel abortions or compel that their marriage advice be followed, Western critics argue that such advice in a one-party communist state is tantamount to a direct instruction. Some tradition-minded Chinese view birth defects as a sign of personal sin of the parents or their ancestors. The intent of the 1995 Maternal and Infant Health Law is to remove birth defects from the population, since handicapped people are often condemned to a life of poverty because of the limited social safety net within China.

13 It is not known how many potential births in China this law has affected. But for purposes of comparison, a study in the United States and Britain found that 3%-5% of all live births have some sort of genetic disorder. It is reasonable to assume that a similar proportion of Chinese births have been prevented due to Chinese policies, though not all birth defects can at present be detected before birth.

14 Bioethicists in the United States and elsewhere objected to the new Chinese law as a violation of fundamental human rights. The Chinese government, however, considers Western concepts of human rights to be no more than a weapon used by Western nations to rhetorically abuse the Chinese people. This is not to imply that there are not Chinese activists who advocate human rights-only that their point of view is officially suppressed.

15 Given the current Chinese thinking in bioethics and the obvious intent of the Maternal and Infant Health Law, it is hard not to imagine the Chinese government taking the next step and actively promoting the creation of genetically engineered babies.

A Race for Bioengineered Supremacy

16 A future of human eugenics is not something to take lightly. One can easily imagine in 50 to 100 years the popularity of 400-pound football linebackers, workers with superior strength or stamina, workers who excel in mathematics, or workers whose bones and organs can better withstand the effects of zero gravity for functioning in outer space. Around the world, parents seeking the best opportunities for their children may want to buy biotechnology that gives their children an edge, and we will see the birth of specialized human beings. Sending them to the right school or arranging for specialized care and training will be supplanted by genetic engineering which will allow parents to give their children ever more advantages. Moral qualms will be brushed aside, and keeping up with the Chinese will be seen as a patriotic duty.

17 Political and moral questions of particular concern to bioethicists would be authoritarian or totalitarian governments that try to genetically program their populations toward docile obedience. Cultures that value docility in women might strive to find gene sequences that predispose women to that trait. There are certainly religious leaders who might see the possibility of programming people to be more religious as a gift from God, a way to make His people more pious and righteous. This assumes that docile behavior or the inclination toward religious piety have a genetic component.

Conclusion

18 Medical advances in the last century have enabled many people with genetic disabilities to be born and to live. For instance, diabetics can now live almost normal lives and have children, but that rarely happened before the availability of insulin treatments. The down side of this development is that defective genes are now presumably accumulating from generation to generation because natural selection is no longer taking place. It's a hard thought to digest, but perhaps genetic engineering will be the twin to modern medicine, completely changing how humans reproduce and improving our chances to live productive lives.

19 Ever since humans began to domesticate animals and plants, we have been engaged in large-scale bioengineering. New species exist because of our intervention, and many species no longer exist because of our actions. Genetic engineering gives us the tools not only to continue to alter other species and our natural environment, but also to alter ourselves.

20 The social and moral consequences of genetic modification are certainly disturbing to contemplate, but we would be naïve to believe that we won't do it. Biological evolution through natural selection has been superseded by cultural evolution. The possibility of directing and accelerating our biological evolution through deliberate genetic engineering of the human genome is now on the horizon.

21 Such new technologies can only be controlled when all nations capable of using these technologies agree to do so. In the absence of broad agreement, technologies will be developed as a matter of international competition. Nuclear weapons and nuclear power are a perfect example of this. Just as the nuclear arms race and the so-called "missile gap" of the late 1950s and early 1960s obsessed Americans during the Cold War, a future genetic human-enhancement race with China, with fears of a "smart-baby gap," may well drive future policies. I believe we will see this within the next 20 years.

About the Author

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QUESTIONS

1. How would China influence Americans to genetically engineer human beings?

_____

(8 pts)

2 a. When was genetic engineering first used to improve the human condition?

_____

b. What was the goal of this procedure? Complete the following sentence:

To replace or restore

_____

(2+6=8 pts)

3. How do American bioethical considerations differ from those of China?

Americans_____

while the Chinese _____

(10 pts)

4. Why would a Chinese woman consider aborting her fetus if genetic defects are detected?
Choose the correct answer to complete the sentence:

According to Chinese culture, abortion is morally acceptable because

- **a. It is best for society.**
- **b. It allows the individual to choose.**
- **c. The individual is autonomous.**
- **d. Life begins at birth.**

(8 pts)

5. What is the purpose of the Maternal and Infant Health Law?
Complete the following sentence:

The 1995 Maternal and Infant Health Law was meant to_____

because _____

(10 pts)

6. Why is the Chinese Maternal and Infant Health Law unethical in the opinion of American bioethicists?

_____

(8 pts)

7. Why do the Chinese reject the views of Western bioethicists?

_____

(8 pts)

8. Why would a program in human eugenics in a country like China pose political and moral questions ?

_____

_____

(8 pts)

9. Genetic engineering has both positive and negative possible consequences. Give an example of each:

Positive: _____

Negative :_____

(8 pts)

10. According to paragraph 18, genetic abnormalities are no longer being inherited because of genetic engineering.

YES /NO CIRCLE THE CORRECT ANSWER

Quote a sentence to support your answer

_____

_____

(8 pts)

11. What is the purpose of the example of nuclear weapons in the last paragraph?

To illustrate the point that _____

_____

(8 pts)

12. What is the purpose of the author in this article?

a. to alert the reader to the China's superiority in genetic engineering of humans
b. to emphasize the threat China presents to ethical behavior in genetic engineering
c. to alert readers to the implications of escalated efforts to genetically engineer humans
d. to emphasize that human genetic engineering is contrary to American bioethics

(8 pts)