

On the Ethical Issues of Biotechnology in the Era of Modern Scientific and Technological Revolution

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Abstract

With the development of biotechnology, a series of ethical problems have emerged, such as the threat of human subjectivity, living environment, life safety and health, the aggravation of social inequality, and the destruction of scientific research Self-discipline. Traditionally, there is a binary opposition pattern between technological optimism and technological pessimism in academic circles. This opposition can't help us solve the problem. Technology pragmatism has opened up a new path for us and provided a new model for us to understand the relationship between technology and society. From the perspective of technological pragmatism, the establishment of "Government-Science-Enterprise-Public" responsibility community is of theoretical significance to the construction of beautiful China in the new scientific and technological revolution era.

Keywords

Biotechnology; Technical Pragmatism; Responsibility Community.

1. Introduction

The progress of biotechnology has greatly changed the way of human production and life and enhanced human well-being. Due to the essential characteristics of biotechnology Gestell as well as insufficient human cognition, it results in the abuse and misuse of biotechnology, and then leads to many ethical problems. For the progress of technology, optimism and pessimism are biased, and their arguments cannot provide a solution to the problem. From the perspective of technical pragmatism, it is conducive to objectively recognizing various problems and harms of biotechnology. It is our mission and responsibility given by the times to construct the responsibility community of "Government-Science-Enterprise-Public" and explore the effective way to control its negative effects.

2. Issues Arising from Biotechnology

2.1. Broken Subjectivity Status of Human Beings

With the development and application of biotechnology, gene therapy, genetically modified food and bionic technology have increasingly penetrated into the lives of people. Technology changes the production and life style of human beings and improves the quality of life. Meanwhile, human beings seem to fall into an embarrassing situation of relying on science and technology. Academics believe that due to the use of new technologies, human beings have been gradually transformed into a new kind of human beings-cyborg. As Clark put it, "all humans are natural-born cyborgs." [1] It results from the fact that in the age of biotechnology, we not only use technology, but also integrate technology with ourselves. Because this integration is highly embodied and transparent, people indulge in the benefits brought by technological progress and ignore its potential harm. "Human beings have been engaged in similar work. They constantly replace incomplete organs in the body through various machine. From this, human beings began to change from creating machines to parasitizing machines." [2] With the penetration of biotechnology, human being is no longer a natural person in the original sense,

the essence of binary opposition between body and mind is disintegrated, and the unity and integrity of man as an organism are also broken.

2.2. Increasing Social Inequality

Harari once said: "The new technology will give people unprecedented abilities, and it is possible to create a biological gap between the rich and the poor: the rich elite will be able to design themselves or their descendants to become 'supermen' with higher physical and psychological abilities, and human beings will be divided into different biological classes". [3] That is to say, due to political and economic inequality, the rich or privileged will give priority to biotechnology to treat or strengthen the human body. In this case, the gap and inequality between social classes will further increase, the social order will be more hierarchical, and contradictions will intensify. In fact, with the development of technology, it is difficult to solve the problem of inequality. Holm pointed out that "The benefits that will flow from medical developments in the next 100 years will not reach everyone who needs them. There will still be large and ethically unjustifiable inequalities in access to good quality medical treatments". [4] Therefore, what we can do is to control the development of technology and relieve the threat of technology to society to a certain extent.

2.3. Destroyed Self-discipline of Scientific Research

In November, 2018, the incident of "Gene editing baby" caused an uproar, and the scientific community and public opinion almost unilaterally condemned the experiment. The reason is that He Jiankui ignored ethics and human morality and completed the first experiment of "gene editing baby" in the world. Generally speaking, the scientific community and the public seem to answer no to whether the application of human cloning technology, gene editing and other technologies is ethical. Whether from a technical or ethical point of view, it is incredible to directly transform human embryonic stem cells into normal human embryos. Therefore, why are there such events as "Gene editing babies" in scientific research? Bourdieu put forward the concept of "scientific field" and explained the problem of Self-discipline in scientific research. According to Bourdieu, "scientific field" is a logical combination of academic system, inter-bank "cooperative" protection system, social composition and organizational structure. [5] "Field" has relative Self-discipline, and it is also easily influenced by economy and politics. In order to ensure the Self-discipline of scientific research, scientists and related workers should "reflect" on their own scientific research activities, consider political, economic, cultural and other backgrounds, "apply objective scientific methods to scientific practice, and scientifically reveal the social conditions of the possibility of this construction". [5] Scientific research is an activity supported by the society and the public. Scientists and scientific workers break away from "reflexivity", coupled with the induction of external capital, "a broad inclusion of stakeholders in the policy process is unlikely to yield consensus when value-based issues are at stake". [6] It will cause the destruction of Self-discipline of scientific research, thus triggering adverse social impacts.

2.4. Threat to Human Life and Health

On the one hand, biotechnology can improve and strengthen human body, but on the other hand, it may also cause events threatening human life and health. The mad cow disease in Europe at the end of last century sounded the alarm for us. Because exogenous bacteria or viruses carried on animal meat may cause insanity, blurred vision, muscle contraction and other symptoms, and even death in severe cases. If technology is allowed to develop and technical risks and hazards cannot be controlled, we can only take some unsatisfactory remedial measures after the accident, "the American public has been warned of the risks to children of pesticide residues on produce and of E. coli bacterial contamination in hamburger meat." [7] However, the impact of such remedies is enormous for agricultural producers, processors and consumers alike. How

to ensure the quality and safety of biotechnology products requires responsibility and moral requirements for both technology itself and producers.

2.5. Destruction of the Ecological Environment

The development of biotechnology will also bring ecological and environmental problems. First of all, genetically modified crops that are resistant to diseases, insect pests and fungi may lead to or accelerate the decline or even extinction of some species, thus posing a threat to biodiversity. Secondly, transgenic plants naturally cross with other wild relatives to produce new species, which may cause ecological benefits similar to alien species invasion, and then induce gene pollution. Thirdly, when transgenic microorganisms disperse into the environment, they may produce new viruses through heterologous cladding, which poses a new disease threat to people, animals and plants. Kolady pointed out that "One possible approach to address general ethical concerns related to technology use is to base regulatory decision on the best available scientific evidence and follow the ethical logic of informed consent". [8] However, new issues arise between regulators and the public, namely, increasing public concern about the credibility of regulators and the technical and financial capacity of regulators to conduct assessments.

2.6. Privacy and Genetic Discrimination

It has become a consensus that the genetic information composed of human genes belongs to privacy, and the disclosure of personal genetic information will bring serious consequences. Protecting the right to privacy is to ensure that the basic rights and interests of people are not harmed, and everyone enjoys the right to privacy of their genetic test results. Genetic discrimination is a new kind of social discrimination. For example, the apathetic attitude towards groups diagnosed with genetic disorders in life makes these groups lose self-esteem and interest in life. The original intention of protecting personal privacy is to respect people and prevent harm to others, especially to avoid genetic discrimination. If genetic information is not well protected, it will happen. "Someday a person's gene may be used to make decisions that affect how that person is viewed by business or the government. Perhaps insurance companies will want to use this information to determine who to insure and who not to insure". [9] Once these situations happen, the consequences will be unimaginable.

3. Opposition between Technological Optimism and Technological Pessimism

Traditionally, the influence on technological progress is often the opposite pattern of optimism and pessimism. Among contemporary scholars, physicist and science writer Dyson is one of the staunch supporters of technological progress and biotechnology. He said, "ways in which technology may contribute to social justice, to alleviate the differences between rich and poor, to the preservation of the earth." [10] Dyson is aware of the two sides of modern technology and realizes that technology sometimes produces unexpected negative consequences, but he still refuses to accept various fatalistic views of technological pessimism, and he believes that the overall trajectory of modern technology development is rising. Dyson is convinced that new technologies can provide more opportunities for human beings to seek happiness. Regarding gene technology, he said, "Within a few more decades, as the continued exploring of genomes gives us better knowledge of the architecture of living creatures, we shall be able to design new species of microbes and plants according to our needs". [10]

Berry is one of many critics for the views of Dyson. For the technical optimism comments of Dyson, Berry commented, "disconcerting to see an eminent scientist such as Freeman Dyson using his own prestige and that of science as a pulpit from which to foretell the advent of yet another technological cure all." [10] He described Dyson's prediction that biotechnology would

improve the lives of the rural poor as irresponsible “business talk”. Berry has two reasons for rejecting technological progress. First, the wide application of new technologies is often driven by consumerism, and he does not want to be an accomplice to an economic system he does not admire; Second, careful historical research shows that new technologies often make our lives poor, not rich. Technology will weaken or destroy the relationship between man and man, man and nature. Generally speaking, Berry is deeply pessimistic about the progress of modern technology, however, he is optimistic about some simple and sustainable agricultural technologies.

In fact, both technical optimism and technical pessimism are biased. N.Dane Scott believes that the reason why the development and application of modern technology will lead to the difference between optimism and pessimism is that the key term “progress” is open and can be interpreted differently. [10] People with different positions have different understandings of “progress”. Whether it is technological optimism or technological pessimism, their interpretations are based on history, but they all have certain one-sidedness. In the new era of scientific and technological revolution, facing the technological progress and various conflicts, the theoretical propositions of optimism and pessimism have certain reference significance for social development, and we should attract experience from them. At the same time, more importantly, our discussion should not stay on the opposition between optimism and pessimism, but discuss what we should do in the new scientific and technological revolution era from the standpoint of technological pragmatism.

4. Responsibility Community Construction of Technological Pragmatism

Technology pragmatism is not a school, but a change of many scholars' thinking mode on technology. Early views on philosophy of technology were either too optimistic or too pessimistic. However, technical pragmatists are more willing to spend more time considering technology and society, technology and ethics, technology and politics, so as to show pragmatism. Colapietro, a philosopher of technology, thinks that although technical pragmatism gets rid of the binary opposition between optimism and pessimism, it is not a panacea. It may not even be a doctrine. When explaining the relationship between science and technology and society, the most practical way is to clarify conflicts, confusions and crises. In technological culture, the most appropriate form of pragmatic ethics is a critical turn to the various practices we involve, including those related to bioethics. [10] From the standpoint of technological pragmatism, we will probably reach some consensus that will help control the development of technology and benefit mankind. From the standpoint of technical pragmatism, constructing the responsibility community of “Government-Science-Enterprise-Public” is helpful to guide our development in the new scientific and technological revolution era.

From the perspective of government departments. Firstly, the government should formulate reasonable technology policies to guide the development of biotechnology. Fukuyama believes that the biotechnology revolution threatens people's status, and the country must regulate technological development from the political level. He said, “Regulation is essentially the act of drawing a series of red lines that separate legal from proscribed activities, based on a statute that defines the area in which regulators can exercise some degree of judgment.” [3] Secondly, through legislation, ethical norms are directly transformed into substantive legal forms, and the development and application of genetic technology are legally regulated to protect the public's right to privacy and right to know; Establish an ethical review system to ensure the standardized operation of ethical review; Establish an effective technology crisis prediction and prevention mechanism, which can start protection as soon as the technology is used for illegal purposes. Thirdly, the government should actively participate in international cooperation, jointly formulate international treaties and international policy standards, and encourage

international consensus and supervision. [11] Finally, governments should seriously consider the needs of developing countries, including their right to participate in technology, and make conscious efforts to narrow the global gap without affecting the development of biotechnology developed countries.

Scientists and scientific workers are the main part of scientific research. When engaged in scientific and technological research, they must make clear what to study, why to study and for what purpose, firmly grasp the direction of scientific research and the practical application of technology, and carefully measure various technical choices. Scientists and scientific workers have the responsibility to address the potential intentional and unintentional misuse of human cell biotechnology through training and teaching, proper external regulation, honest self-assessment and self-regulation. [11] At the same time, Scientists and scientific workers should fulfill government policies, abide by laws and regulations, listen to public opinions, and have the responsibility to guide the public and promote the public to understand the meaning, risks, hazards and uncertainties of biotechnology. For technologies that are still in the early stage of development, scientists need not only to “reflect”, but also to evaluate potential dangers and side effects, including any potential ethical and environmental hazards.

For biotechnology enterprises, enterprises should put social responsibility first. Biotechnology enterprises should aim at alleviating human suffering, reducing environmental damage and improving human living conditions. In the final analysis, the government invests in biotechnology for “good” and for the prosperity and well-being of mankind. Secondly, biotechnology enterprises should spend time considering the impact of a new technology on the public before applying it, and collect the opinions of the public and other scientists. Thirdly, biotechnology enterprises should consider and solve the well-being of groups indirectly involved in scientific research. For example, some marginalized groups are often the targets of genetic research. In this process, members of this group need to be respected and taken seriously. Finally, enterprises should reach a good trust relationship with the public. Thompson pointed out that trust is a moral relationship. Both sides who trust each other have their own moral principles and expectations for each other's behavior. [12] Good trust between the public and enterprises can promote the safe and rational application of biotechnology.

With the progress of biotechnology, public life has been improved. At the same time, the public also demands their due rights. The public's right to know, participate and privacy are guaranteed in the form of legal provisions. In addition, the public should actively accept the propaganda from the government, scientific community and enterprises. The information of publicity is objective and accurate, which can make biotechnology be viewed scientifically and rationally by the public, thus laying a good foundation for the development of biotechnology. Through a lot of publicity, the public will also strengthen the awareness of safeguarding rights and enrich the knowledge of safeguarding rights, so as to give full play to the supervisory role of the public. As a member of society, people have the responsibility to accept norms, abide by duties and fulfill obligations. Therefore, when technical products that violate laws and ethics occur, the public should actively expose them through the media or reflect them to relevant parts, so as to promote the sound development of technology, better protect bioethics and make technology benefit mankind. A healthy technological society must require a certain balance between technological progress and its negative effects. The construction of “Government-Science-Enterprise-Public” responsibility community is directly related to the economic and social development in the new scientific and technological revolution era and the construction of beautiful China, so we need to make joint efforts.

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