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BIOTECHNOLOGY AND BIOETHICS: CHARTING A COUSRE FOR SOCIETY

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ABSTRACT

Biotechnology is often considered the science of future. It is one of the most promising, yet controversial field of science. With enforcement of proper set of rules, or bioethics, we can ensure the morally right usage of several applications of biotech in our society. It is a sociotechnical system, where all components interact with one another. Biotech is not only linked to the scientific, but also to the economic, political, social and even theological aspects of our society. Biotechnology can have a wide and complex impact on the society, at the personal, institutional, and the global level. This paper entails the intersection of society and ethics along with the challenges we still face. Biotech breakthroughs offer a great hope, but along with contemplating the risks and their roles in our society, we still have a long way to go.

Keywords: biotechnology, bioethics, society, applications, global governance

INTRODUCTION

Biotechnology is defined as, an integrated application of natural and engineering sciences with the aim of using living organisms, cells and their component parts for products and services, according to the European Federation for Biotechnology (EFB). Basically, it is the usage of biology to improve human health and society. It has been an integral part of the society since the very beginning of civilization, whether as the domestication of animals and plants, discovery of processes such as fermentation, or production of vaccines. It has evolved evidently by the past century and now involves manipulation of genomes of several organisms as well. There is no speculation in saying Biotech can open doors to create wonders in the modern-day society. It is a significant force to aid in improving to the quality of life. With increasing applications and complexity of this field, the social implications of biotechnology also need equal attention.

Biotechnology and Society is not just about technology, but also about what we are becoming through this technology. We need to look into the extent of transformation biotech can bring to our society and culture as a whole. And hence, comprehending the complex interconnections between all these elements.

But along with more involvement, there arises a conflict of interest. For proponents of these biotechnologies, stem cells and cloning, individually and in combination, "promised" a future of increased health and long life, but opponents decried the violation of the natural order represented by cloning and the "murder" of developing human life represented by embryonic stem cell research (Lynch, 2011). Attention devoted to biotechnology results in various questions and certain small-scale battles including those concerning cloning, the patentability of genetic information, and laboratory safety. Along with concerns of high-profile controversies. They include debates about the safety of genetically modified foods, worries about the privacy of genetic information, the possibilities of bioterrorism, biotech's contribution to the rising costs of health care, and the politically divisive debate about stem cell research. These controversies are all too often framed around the question of "should we or shouldn't we".

Hence, to establish what is morally right and wrong, we need to establish certain values. Bioethics is the study of ethical, social, and legal issues that arise in biomedicine and biomedical research. Potter in 1970 proposed bioethics as a new discipline calling it as "the science of survival," which "would attempt to generate wisdom, the knowledge of how to use knowledge for social good from a realistic knowledge of man's biological nature and of the biological world." They are necessary to analyse the benefits and risks arising out of the moral choices affecting living organisms for the good of individuals, the environment and society. The four fundamental principles of bioethics include:

(a) Beneficence, which is described as practice of good deeds.

(b) Non maleficence which emphasizes obligations not to inflict any harm.

(c) Autonomy is the guiding principle for recognition of human capacity for self-determination and independency in decision-making.

(d) Justice, the ethical principle of justice which is based on the conception of fair treatment and equity through reasonable resolution of disputes. (Minakshi Bhardwaj, 2001).

SOCIAL IMPACTS

To understand biotechnology in its true essence means looking at the big picture, seeing the connections and interactions between all things. One powerful framework for analysing technological constructs in this way, is called coproduction. It suggests that the outcomes of science and technology are always coproduced by social and technical circumstances—we cannot understand stem cells or climate change or quantum mechanics without paying attention to both technical and social circumstances at the same time. There can be several views on definitions and origins of biotechnology, with some people focusing only on some particular aspects, like genetic engineering while others taking a holistic view that involves changes in several characters.

It's a sociotechnical system: a complex and interacting set of elements that includes both technical (test tubes, gene sequencing machines) and social things (laws, institutions, people). The effect of this in the society is quite evident through the fields of medical sciences, forensics and even agriculture. All of this resulting in direct effect on people, their health, employment, and quality of life, hence uplifting the society as a whole.

Biotechnology developments are often controversial because of the ethical issues they raise. They frequently become the subject of public debate. Sometimes, people are wary of new biotechnologies because they involve doing things that haven't been done before, and they are unsure of possible future effects. Public debate raises the issues and presents different viewpoints. This can help people make informed decisions and also influence government organisations that control new research and development.

Commercial interests greatly impact the technology that is developed and maintained on the markets, as well as social science inquiries are mandatory for social success in a time of quickly developing technology and to predict potential negative side effects, before they are larger problems than can be dealt with. Thus, in a way, the technology is inseparable from the social factors- there is nothing that is technical that is not always also social.

Not only does this play a role in our today, but has a significant effect on the path of a sustainable future. It is easy to see society reflecting on the consequences, both positive and negative, of this emerging field. Some direct approaches are understanding the needs of modern day and assist in find solutions. Cleaner energy, food security, ecosystem conservation, greener environment, health security, smart cities, enhancing quality of life, all of these have direct role of biotech in some way or other. Biotechnology has been used to produce genetically modified crops, that require less water and fertiliser, hence reducing the amount of pollution they produce. It's also possible to use biotechnology in developing new ways of managing waste, improving clean energy production, and treating emissions from industrial processes. Not to mention the explosive population growth, new and re-emerging diseases, we have witnessed one such event globally as COVID-19 recently. The range of environmental risks serious enough to jeopardize international stability extends to massive population flight from man-made or natural catastrophes. Innovation and science have become an integral part of our society and there is no turning back from that. The future that we envision will need to be driven by applications of biotech, but in turn our society should be safeguarded with bioethics. The tools of social science are required to identify the most significant variables involved in producing conflicts, and information technologies are needed to detect changes in these variables and to provide early warning. Following such a strategy, we can embrace the notion of preventing global threats, even before they occur.

If we talk about the 21st century, biotech has not only made its way into laboratories and research fields, but also in debates amongst locals, books, fiction novels, and even plot of several movies. Not to forget the shelves of supermarket being filled up with smart food, and almost everyone knows about the green revolution or dolly the sheep and rosie the cow.

Biotechnology reveals much about present-day relationships between nature and culture, biology and technology, living and non-living, human and nonhuman. By studying and analysing biotechnology, we can come to see our own place in the world a little more clearly. (Hallam Stevens, 2016)

NEED FOR THE ETHICAL DIMENSION

Modern biotechnology represents a major breakthrough in scientific research and triumph of human ingenuity. It can be most powerful ally in fighting against disease and disabilities, hunger and poverty on a global scale. It provides opportunities to cope better with devastation of nature brought about by the earlier industrial revolution and over population what has been described as 'the demographic explosion'. But the downside of the biotechnology has largely to do with this unprecedented power, its use and its control.

Some of the major questions that arises now, are that to what extent should this be allowed? Who should have the rights to access to such a power? What measures are morally right? What purposes should be entertained? And what should decide which category of people should benefit from it? Not to mention the concerns about safety of genetically modified food, the breaches in privacy genetic information, hybrid babies, possibilities of bioweapons and bioterrorism, stem cell researches and political role in all of this.

Science is not the only symbol system of ultimacy, morality, and meaning competing to define the cultural role of the new genetics. Genetic engineering "involves nations, corporations, individual researchers, investors, and consumers," and thus "cannot be said to serve the interests of humanity" as such, as is so often claimed (Cole-Turner 1993, 54).

Biotechnology has put enormous power in our hands, and yet the power is essentially ambiguous; it can be used for both good and bad purposes. There is a growing concern that this new technology may redefine our relationship to nature by irreversibly and detrimentally changing nature's course. Altering natural evolution through human tampering would cause incalculable risks for human integrity, well-being and freedom. (Becker,1996).

Some view genetic engineering as a threat, others may feel it as a marvellous breakthrough. For authentic usage, we need to balance human centred values, and nature. Hence an easy solution to all these dilemmas, are constructing a set of rules. Various groups of society emphasize different ethical principles for achieving their goals. For example, Environmental NGOs oppose the use of genetic engineering, based on more biocentric views, as their only goal is to protect the

environment at any cost, which can also be considered radical due to the demands of present-day society. Others may support a more balanced approach with a sustainable use of technology, without ill effects on the environment. The economic sector looks at this in a profit-oriented way, to produce maximum benefits, and defending it under the name of ultimate social development.

There are three different ways to view bioethics and these ways describe the norms of social structures and relationships between people in society and also to their personal lives.

- Descriptive Bioethics is the way people view life, their moral interactions and responsibilities with living organisms in their life.
- Prescriptive Bioethics is to tell others what is ethically good or bad, or what principles are most important in making such decisions.
- Interactive Bioethics is discussion and debate between people, groups within society, and communities about descriptive and prescriptive bioethics. It increases communication and dialogue within societies to clarify doubts and tries to develop a universal acceptability of things. (Macer, 1998)

GLOBAL PRESPECTIVE AND REGULATION

Since biotech is a multidisciplinary field, its management also requires a global monitoring. The three major areas where applications of biotech are currently used the most are food and agriculture, environmental applications, research in drugs, medicine and health care and general technological developments of science.

Food and Agriculture Oganisation of the United Nations (FAO) is the responsible body for governing the biotechnology applications in food and agriculture all over the world. It involves development of domesticated plants and animals, fisheries and forestry.

The medicinal side of biotechnology is under the jurisdiction of the World Health Organization (WHO). One of the six core tasks of the WHO's secretariat is to stimulate the development and testing of new technologies, tools and guidelines for disease control, risk reduction, health care management, and service delivery. (Bhardwaj, 2001)

The environmental aspects are governed by the United Nations Environmental Programme (UNEP). It encourages sustainable development through sound environmental practices.

The picture for developing countries is a bit different. The economic, political and social status of developing countries usually vary. Although, majority of the world population lives on the underprivileged side, thus, biotech will most definitely affect them. Better food security, health facilities can be availed, if we ensure adequate safety standards during exploiting the applications biotech. Agricultural biotechnology will have a direct effect on eradicating hunger, reducing malnutrition, and help in providing nutrient enriched diet. Similarly, vaccines and better health facilities can also involve biotech. With limited resources, lack of technology and expertise, developing countries are constrained from expanding their use of biotechnology.

CONCLUSION

Biotechnologies, like any other technologies, are not plainly good or bad. Rational factor determining social acceptance of biotechnology is the degree to which technology is under society's control. There are legal and institutional mechanisms to govern their usage. But what we can conclude is, biotech can be beneficial at all the levels of our society. Not only does it shape our future, but also ensure a quality of life in the present.

At the personal level, biotechnology now influences even the most intimate aspects of our lives. It can be best explored by examining the development and impact of reproductive technologies, especially in-vitro fertilization (IVF). And working with gene therapies for several congenital disorders.

It allows us to ensure ownership. Thus reshaping the social and political functions. Patenting of modified microorganisms, or rights to the intellectual property contained in the plants, may have their ill effects, but alongside lies the betterment of the social institute.

An even larger scale, it alters global relationships. With production and modifications of viruses, tissues, cells, pharmaceuticals, biotech is a part of international trade and is a matter of biosecurity.Biotechnology has a dependable potential to offer social, economic and medical

benefits, if it is balanced with the avoiding risks, safety, and misuse. And it may allow individual and social benefits.

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