v. 4, n. 25, 2024

Scientific Journal of Applied Social and Clinical Science

FRONTIERS OF GENETIC ENGINEERING: BIOETHICAL CHALLENGES IN HUMAN TRANSFORMATION

Tania Haidée Torres Chávez
Universidad Michoacana de San Nicolás de Hidalgo, Morelia, México
https://orcid.org/0009-0006-5313-8304

Miguel Ángel Medina Romero
Universidad Michoacana de San Nicolás de Hidalgo, Morelia, México
https://orcid.org/0000-0003-4067-2816

Acceptance date: 18/12/2024

Abstract: Advances in biotechnology and eugenics have generated profound changes in the conception of human life and its development, posing important ethical and social challenges. This text examines the implications of these advances from the perspective of human dignity and fundamental rights. It analyzes the concept of eugenics, its history and its contemporary manifestations through genetic engineering and transhumanism. It also emphasizes the need for an ethical and regulatory framework that balances scientific progress with the preservation of human dignity, avoiding discriminatory practices and protecting the most vulnerable sectors of society. And it emphasizes interdisciplinary collaboration between experts in science, ethics and law to address these challenges. The text concludes by stressing the responsibility of researchers, scientists and authorities in the ethical implementation of biotechnological technologies, prioritizing the collective welfare and respect for fundamental human values.
Keywords: Biotechnology, Eugenics, Human dignity, Biomedical ethics, Transhumanism.

INTRODUCTION

Advances in biotechnology and eugenics have profoundly transformed our understanding of human life and its development, posing unprecedented ethical and social challenges. This article examines the implications of these advances from the perspective of human dignity and fundamental rights, focusing on the impact of genetic engineering on human nature.

Human beings, characterized by their rationality, sensitivity and autonomy, have constantly evolved in their search for a harmonious and fulfilling life. Throughout its history, it has faced adversities that have led to the transformation of its own nature through scientific and technological development. One of the most significant results of this evolution is the emergence of genetic engineering, a discipline that seeks to improve the quality of life and even create life through cellular manipulation.

Genetic engineering, defined as a "set of techniques to isolate and modify genes", allows "obtaining genes from an organism to transfer them to any place of the same organism or another, but in different combination, altering the hereditary characteristics of the organism" (Duque, 2019, p.67). This advance has had profound implications in diverse fields, including biology, medicine, engineering, philosophy, law and morality.

This study analyzes these repercussions from an ethical and legal perspective, considering the effects of these advances on the harmonious development of society. To address this complex issue, it examines the contributions of leading thinkers in different fields, including philosophers Xavier Rubert de Ventós and Michael Sandel, physician Giovanni Berlinguer, jurists Angélica Laurent Pavón and Aída María Ponce del Castillo, and ethics professor Roberto Esteban Duque.

His contributions in the fields of ethics, bioethics, law and biotechnology provide a comprehensive framework for understanding the challenges that genetic engineering presents to humanity, particularly with regard to the transformation of the origin of life and human health. This interdisciplinary analysis seeks to contribute to the current debate on the ethical and legal limits of genetic manipulation, considering its potential benefits and risks for the harmonious development of society.

GENESIS AND FOUNDATION OF HUMAN NATURE

The human life cycle, which includes birth, growth, reproduction and death, has been the subject of study from various scientific and philosophical perspectives. This article examines the natural origin of the human being, considering advances in genetic engineering and their ethical and social implications.

Traditionally, gestation occurred through the fertilization of the egg by the sperm during sexual intercourse. However, scientific and technological advances have introduced alternative methods such as artificial insemination, in vitro fertilization and surrogacy, challenging the traditional conception of the origin of human life.

Hannah Arendt (2015) offers a philosophical perspective on this issue, linking the biological process of the human body with "the vital needs produced and nourished by labor in the process of life" (p. 21). This underscores the view of the interconnectedness between biological processes and the human condition itself.

For his part, Michael J. Sandel (2007) attributes the origin of life to "something -for example, God or nature-, which is also not at the disposal of another person" (p. 125). This idealistic conception confers on human life a status of superior good, allowing the exercise of other fundamental rights such as freedom and self-determination.

From a scientific perspective, Charles Darwin's theory of evolution proposes that human life is the result of a process of transformation over time, mediated by natural selection. This approach has been widely accepted by the scientific community because of its basis in observation, experimentation and empirical results.

Giovanni Berlinguer (2002) extends the notion of life beyond mere biological existence, stating that "it means not only being alive, but also being in good health and having reasonable security from the actions of others that may cause death, illness, severe pain or disability" (p. 90). This holistic definition emphasizes the importance of quality of life and the integral well-being of the individual.

The debate on the natural origin of the human being continues to be a topic of research and discussion in scientific and philosophical circles. Despite advances in our understanding, many questions remain unanswered, keeping interest and research in this field alive.

In this context of uncertainty and evolving knowledge, it is crucial to consider how eugenics and biotechnological practices are influencing the development of human life. These advances pose new ethical and practical challenges to our understanding and manipulation of the origin of life, forcing us to reconsider the limits and implications of these technological interventions in human nature.

TECHNOLOGICAL AND ETHICAL EVOLUTION: CHALLENGES OF GENETIC ENGINEERING IN HUMAN NATURE

Advances in biomedical research have brought about significant changes in the development of societies, giving rise to novel procedures that seek to improve the health and fitness of individuals, even in cases where natural reproduction is not possible. These advances raise important ethical and philosophical questions about the nature of human life and its intrinsic value.

Human life has usually been considered a priceless gift, an attribute that confers dignity and uniqueness to each individual. Roberto Esteban Duque (2019) emphasizes this perspective by stating that "we are absolutely dependent and, essentially, everything is a gift, not man's creation" (p. 16). This underlines the vision of the transcendence of the human being beyond its biogenetic composition.

Eugenics, a term coined by Sir Francis Galton in 1883, emerged as a movement that sought to improve the genetic constitution of mankind. Sandel (2007) describes how Galton proposed "to generate a race of highly gifted men by a wise policy of intermarriage over several consecutive generations" (pp. 95-96). However, history has demonstrated the dangers inherent in such ideologies, as evidenced by the policies of forced sterilization in the United States and the atrocities committed during the Nazi regime.

Although eugenic laws have been widely rejected, advances in biotechnology offer new possibilities for modifying the human species. Ponce del Castillo (2006) warns of the possibility of "an evolutionary change such that a new species, different from homo sapiens, would originate" (p. 102). This process, called *technoevolution,* poses significant risks for society, including the potential exacerbation of inequalities and discrimination.

Transhumanism, defined by Postigo (2016) as "a cultural, intellectual and scientific movement that affirms the moral duty to improve the physical and cognitive capabilities of the human species," represents a new paradigm in human genetic modification. However, it is crucial to consider the ethical implications of such advances.

Malpica Hernández (2006) emphasizes that "in new biotechnologies it should always be kept in mind that the main driving force of research is the conquest of knowledge and the progress of humanity, when this knowledge is reversed against the fundamental human values of the human being it should not be applied" (p. 98). This warning underlines the need for an ethical approach in the application of biomedical technologies.

Thus, while biotechnology offers unprecedented possibilities for improving the human condition, it is imperative that its development and application be guided by sound ethical principles. Human dignity, equity and collective well-being must be priorities in the pursuit of scientific progress, ensuring that advances in genetic engineering benefit all of humanity without compromising the fundamental values that define our existence.

FRONTIERS OF BIOENGINEERING: ETHICAL IMPLICATIONS OF HUMAN TRANSFORMATION

Advances in biotechnology and transhumanism have profoundly transformed our understanding of human beings and their potential for enhancement. This article examines the ethical and moral implications of these developments, focusing on how science and technology are redefining the limits of human life and its enhancement.

The human being, as a complex entity integrating physical, emotional and cognitive aspects, is at the center of this debate. Biotechnology has not only improved the quality of life and prolonged open human existence, but also holds new possibilities for the generation of life, challenging the traditional limits attributed to nature.

This study analyzes human beings from scientific and moral perspectives, recognizing their uniqueness among living beings and their capacity to transform and evolve their own essence. It addresses fundamental values such as respect, justice, equity and autonomy, focusing on how biotechnology has influenced the origin of life, health and the search for human perfection.

Crucial questions arise: how have biotechnological advances influenced the development of life in line with morality and ethics; what frameworks should be applied in biotechnology to save human dignity; and how can the state prevent discriminatory practices arising from the use of biotechnology? To address these questions, we examine the work of Spanish

philosopher Xavier Rubert de Ventós, whose *Ethics without Attributes* proposes an ethical perspective adapted to contemporary circumstances. Rubert de Ventós warns against the risk of confusing ethical and moral discourses, a crucial distinction in the context of biotechnology (Rubert de Ventós, 2006, p. 49).

Morality, according to Rojas Amandi (2014), "addresses the intimacy of the subject, his conscience considered in its individuality" (p. 176), while ethics reflects on human acts in their social context. This distinction is fundamental when considering the implications of biotechnology on human life.

Roberto Esteban Duque suggests that biotechnology seeks the *biological immortality* of the human being. However, Sandel (2007) suggests the need to "allow such research to proceed within the framework of regulations that reflect a moral restraint appropriate to the mystery surrounding the first moments of human life" (p. 194).

It is imperative to rethink the development of biotechnological research in order to prevent eugenic practices that go against ethics and moral values. A balance must be sought between scientific progress and the preservation of human dignity, taking into account equality, justice and the common good.

Therefore, the field of biotechnology and the ethics of human enhancement presents complex challenges that require an interdisciplinary approach. It is crucial to develop ethical and legal frameworks to guide this research, safeguarding fundamental rights and human dignity, while harnessing the potential benefits of these advances to improve the human condition.

ETHICAL DILEMMAS AT THE LIMITS OF LIFE: BIOTECHNOLOGY AND HUMAN EVOLUTION

Advances in scientific and technological research have led human beings to seek their own improvement, treat diseases and prolong their existence. As Rojas Amandi (2014) points out, this has directed "biotechnological power to alter, through direct intervention, not diseases, but normal processes of the human body and mind to improve their capabilities and performance" (p. 176), thus promoting an induced or artificial evolution.

Biotechnology has evolved significantly, allowing procedures such as artificial insemination, in vitro fertilization, surrogate motherhood, sex selection of children, termination of pregnancy due to malformations, cell manipulation for organ transplants, and administration of drugs to stimulate growth or improve memory and intelligence. However, these advances raise fundamental ethical dilemmas, as Esteban Duque (2019) points out, about "the consequences for embryonic manipulation of the assumption of two antagonistic ethical paradigms, as well as showing the necessary relationship between science and values" (p.136).

Rubert de Ventós (2006) warns that the new biotechnologies are influencing "natural processes and will force scientists and researchers to make decisions about what seems acceptable or not: about what is moral or legitimate among what is becoming feasible for the first time" (p. 112). It is crucial that biotechnological practice respects and weighs human dignity, without transgressing the essence of the person or his or her fundamental rights.

There is a risk of generating social chaos where only the powerful have access to eugenic practices, increasing inequality and social inequity. Ponce del Castillo (2006) warns about "the possibilities of ending up practicing selective eugenics, experimentation on

embryos and the commercialization of human corporeity and procreation" (p. 103).

To address these challenges, Berlinguer (2002) suggests facing them "with an innovative vision that includes an understanding of the historical context in which they arise" (p. 85). It is essential to attend to the essence of the person, equality and health promotion, without falling into indiscriminate genetic optimization.

Sandel (2007) reflects: "genetic manipulation seems somehow more intrusive, more sinister than other ways of optimizing performance and pursuing success. But in moral terms, the difference is less significant than it seems" (p. 194). This perspective underscores the ethical complexity of these interventions.

It is imperative that all those involved in these practices are aware of their ethical and moral implications. In Mexico, it is necessary to strengthen the codes of ethics in institutions that carry out biotechnological practices and to promote the integration of bioethics and research ethics committees, as established in article 41 bis of the General Health Law. These efforts should harmonize scientific and technological development with fundamental ethical principles, respecting human dignity, freedom, autonomy, equality, justice and solidarity.

FRONTIERS OF GENETIC ENGINEERING: BALANCING SCIENTIFIC PROGRESS AND HUMAN INTEGRITY

Human dignity, a value inherent to the person, characterizes him or her as a sentient, rational and autonomous being. This fundamental concept faces new challenges with the advance of biotechnology, which raises profound ethical questions about the nature of human life and its manipulation.

The human genetic code, described by Esteban Duque (2019) as "an instruction manual that harbors a kind of indeterminacy" (p. 27), gives each individual a unique identity. However, biotechnological advances such as artificial insemination, in vitro fertilization and surrogacy challenged the traditional conception of life and reproduction.

Biotechnology, by intervening in issues inherent to human life and health, requires careful analysis of its impact on human dignity. As Esteban Duque (2019) points out, there is a risk that "biotechnology and bioengineering tend to develop for their own autonomous purposes, running the risk of being cited at the margin of the dignity of the human person in its various stages" (p. 138).

It is crucial to consider the ethical and moral implications of these practices in order to avoid infringement of human dignity and prevent negative effects on society. Sandel (2007) warns that "enhancement, cloning and genetic engineering pose a threat to human dignity" (p. 21), highlighting the need to examine how these practices may affect our humanity.

To address these challenges, an interdisciplinary approach involving professionals from diverse areas, including philosophers, scientists, and bioethicists, is necessary. Esteban Duque (2019) suggests "awakening the sensitivity of the researcher and scientist to detect the implications of their work, beyond the purely scientific" (p. 351).

The following actions are proposed to protect human dignity in the context of biotechnology: to value the whole person, considering physical, volitional and spiritual aspects; to prioritize the elimination of suffering and pain, facilitating personal fulfillment; to use biotechnological procedures to improve the quality of life, avoiding the search for perfection that may generate inequalities; and to prevent discriminatory practices that may arise from the unequal use of biotechnological technologies.

Malpica Hernández (2006) emphasizes that "in the new biotechnologies it should always be kept in mind that the main driving force of research is the conquest of knowledge and the progress of humanity" (p. 98). However, when this knowledge goes against the fundamental values of the human being, it must be reconsidered.

Consequently, the development and application of biotechnology must be guided by sound ethical principles that safeguard human dignity. Responsibility and social commitment in the practice of biotechnological procedures are essential to ensure that these advances benefit humanity without compromising human values.

BIOTECHNOLOGY EQUITY: THE ROLE OF THE STATE IN THE PROTECTION OF HUMAN RIGHTS AND SOCIAL JUSTICE

Biotechnology and its ethical, moral and social implications pose significant challenges for States and the international community. This article examines the role of the state in regulating and promoting ethical biotechnological practices, as well as the legal and social challenges arising from these developments.

States have the responsibility to create public policies that guarantee access to health as a fundamental right, improving the quality of life of citizens while safeguarding human freedom and equality. This requires a delicate balance between the promotion of biotechnological innovation and the protection of fundamental human rights.

Investment in biotechnology varies significantly among countries, with nations such as the United States, Canada and several European countries at the forefront. However, legislative development has not kept pace with scientific advances. Although international frameworks such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) International Bioethics Committee and the Universal Declaration on the Human Genome and Human Rights exist, more specific laws are needed to protect human dignity and ensure equity.

Ponce del Castillo, citing Habermas, warns that "changing our emotional characteristics would force us to transform our human values" (2006, p. 114). This underscores the need for comprehensive normative regulation of genetic manipulation to prevent the erosion of personal freedom and the exacerbation of social inequalities.

Sandel (2007) suggests that "we should allow such research to proceed within the framework of regulations that reflect a moral restraint appropriate to the mystery surrounding the first moments of human life" (p. 195). This approach seeks to balance scientific progress with fundamental ethical considerations.

In Mexico, the National Bioethics Commission and the Bioethics and Research Ethics Committees play a crucial role in the evaluation of ethical and bioethical dilemmas in clinical practice and research. However, more robust and updated regulations are needed to keep pace with biotechnological advances.

The global challenge of biotechnology regulation requires an interdisciplinary and collaborative approach. It is essential to involve professionals from health, law, philosophy, sociology and anthropology, together with government representatives, to develop strategies to address the complex ethical, social and legal issues arising from these advances.

Thus, effective regulation of biotechnology is crucial to preserve human dignity and promote social welfare. A coordinated effort is needed at the national and international levels to create regulatory frameworks that encourage responsible innovation while protecting the fundamental rights and ethical values of society.

CONCLUSIONS

Advances in biotechnology and eugenics have generated profound changes in the conception of human life and its development, posing unprecedented ethical and social challenges. This study has examined the implications of these advances from different perspectives, including ethics, law, medicine and philosophy. The following are the main conclusions derived from this interdisciplinary analysis, ranging from the transformation of human nature to the need for ethics-based public policies:

1. The transformation of human nature driven by biotechnological advances has generated profound changes in the life, health and essence of people in today's society. This phenomenon requires an analysis from an interdisciplinary perspective that promotes a conscious and responsible reflection on its ethical and social implications.

2. The emergence of biogenetics has given rise to biomedical ethics, a fundamental discipline for saving human rights and human dignity. This discipline seeks to balance the improvement of health and physical development with respect for the human essence, promoting an integral quality of life.

3. It is imperative that experts in law, philosophy, medicine, sociology and anthropology collaborate to develop ethical and regulatory frameworks to guide the application of biotechnological practices. This collaboration is crucial to prevent potential negative consequences of genetic manipulation, such as dehumanization or the creation of entities that defy natural law.

4. The Mexican State has the responsibility to promote a harmonious and equitable social coexistence. To this end, it is necessary to establish a regulatory framework that regulates and guarantees the ethical application of biotechnological procedures, based on principles such as respect, freedom, autonomy, justice, equity, beneficence, transparency and confidentiality.

5. Mexican legislation should strengthen the role of the National Bioethics Commission and the hospital bioethics and research ethics committees. These bodies must work efficiently to save life and human dignity in the application of biotechnological procedures.

6. The coordinated participation of experts from various disciplines and governmental authorities is essential to address this issue of social importance. The regulation of biotechnology and eugenics is a global challenge that requires international cooperation. All States must actively participate in the creation of policies and regulations that prevent the *dehumanization* of society and mitigate the potential risks to humanity.

7. It is necessary to establish ethical guidelines based on scientific evidence that serve as a reference for the creation of public policies. These guidelines should facilitate the implementation of biotechnological procedures that improve the quality of life and procreation processes, without compromising the dignity and essence of human nature.

In summary, the field of biotechnology and eugenics presents complex challenges that require a holistic and collaborative approach. It is essential that society, governments and the scientific community work together to develop ethical and legal frameworks that guide biotechnological progress in a responsible manner.

The recommendations proposed here have sought to balance scientific progress with the preservation of human dignity, underscoring the importance of effective regulation and international cooperation in this critical field for the future of humanity. Only through continued dialogue and critical reflection can we reap the benefits of these advances while preserving human dignity and the fundamental values that define our humanity. The future of our species depends on our ability to wisely navigate these new scientific and ethical frontiers.

REFERENCES

Arendt, H. (2016). *La condición humana.* Paidós.

Berlinguer, G. (2002). *Bioética cotidiana.* Editores Siglo XXI.

Duque, R.E. (2019). *Ética biomédica. Aspectos sociales de la biomedicina.* Ediciones Universidad de Navarra.

Guillén, J.L. (2023). *Florecimiento humano en la era de la inteligencia artificial.* Ediciones Universidad de Navarra EUNSA.

Malpica Hernández, L. (2007). El derecho a la intimidad y el genoma humano. En D. García Fernández & L. Malpica Hernández (Eds.), *Estudios de derecho y bioética* (Tomo I, pp. 79-99). Porrúa.

Ponce del Castillo, A.M. (2007). La evolución de la humanidad ante las intervenciones biotecnológicas: reflexiones sobre el posthumanismo. En D. García Fernández & L. Malpica Hernández (Eds.), *Estudios de derecho y bioética* (Tomo I, pp. 101-115). Porrúa.

Postigo, E. (2016). Naturaleza humana y problemas bioéticos del transhumanismo y el mejoramiento humano. En A. Cortina & M.A. Serra (Eds.), *Humanidad. Desafíos éticos de las tecnologías emergentes* (pp. 232-256). Ediciones Internacionales Universitarias.

Rojas Amandi, V.M. (2000). *Filosofía del derecho* (2ª ed.). Editorial Oxford.

Rubert de Ventós, X. (2006). *Ética sin atributos.* Editorial Anagrama.

Sandel, M. (2007). *Contra la perfección. La ética en la era de la ingeniería genética.* Marbot ediciones.

Serrano, S., & Vázquez, D. (2021). *Los derechos en acción. Obligaciones y principios de los derechos humanos.* FLACSO.