
Islam and Modern Biotechnology: Ethical Reflections on Cloning and Stem Cell Research

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Abstract

The emergence of the modern biotechnology specifically in the fields of cloning and stem cell research has posed difficult ethical issues, especially on human dignity and identity, and the moral boundaries of scientific intervention. The Islamic bioethics provides a philosophical model that does not renounce the scientific advancement but also does not support it blindly. This paper analyses cloning and stem cell research using the Islamic ethical thought in relation to the Quran, authentic Hadith, classical Islamic jurisprudence, and Islamic philosophical teachings as presented by Nahj al-Balagh. Through a normative analytical lens, the paper discusses that the pursuit of knowledge, rational reflection, human dignity, stewardship, prevention of harm, and the aims of the Islamic law are some of the foundational concepts in Islam that can be used to make ethical judgment of biotechnological practices. The discussion shows that reproductive human cloning is ethically inadmissible because it would interfere with lineage, cause possible damage, and violate human dignity, but therapeutic cloning and stem cell research can be conditionally acceptable when it is performed in the name of true medical utility and under strict ethical guidelines. The paper finds that the active use of Islamic ethics can take place to promote responsible biotechnological development through the harmonization of scientific innovation and morality and overall human welfare.

Keywords: Islamic Ethics, Modern Biotechnology, Therapeutic Cloning, Embryonic Stem Cells, Bioethical Governance, Religion and Science

Introduction

Biotechnology is one of the most transforming fields in science in the modern age and it is a branch of science that incorporates the scientific fields of biology and technological advancement to manipulate life in the interest of mankind. Generally, biotechnology refers to the use of biological organisms and cells or molecular processes to establish products and technologies that enhance human health, agriculture, industry and environmental sustainability (1). Contemporary biotechnology has been characterized by molecular specificity, direct manipulation of genomic material, cellular pathways and development. In the late twentieth century, the development of recombinant DNA technology has changed the paradigm of biological studies because now scientists can isolate, alter, and exchange genes between different species. The molecular revolution provided the basis of highly sophisticated (2). The technologies have been used to aid research in modelling diseases, regenerative medicine, drug discovery, and personalized therapeutics. Nevertheless, their ability to interfere even on the very principle of life has also brought about deep ethical, philosophical, and religious issues.

Cloning and Stem Cell Research: Scientific Foundations

Cloning is the reproduction of a genetically identical biological material and can be on a level of genes, cell or organism. In contemporary biotechnology, there are two main types of cloning namely, reproductive and therapeutic cloning. Reproductive cloning is interested in creating a genetically identical organism by using Somatic cell nuclear transfer (SCNT), and therapeutic cloning is interested in creating embryos in a cloned form just to obtain pluripotent stem cells but does not plan to create a living organism (3). Despite animal experience that animal cloning is technically feasible, human reproductive (4).

Stem cell research, which is closely connected to cloning, involves cells that have the potential to self-renew as well as develop into specialized cells. There are three types of stem cells, including embryonic stem cells, adult (somatic) stem cells, and induced pluripotent stem cells. Embryonic stem cells have a high level of pluripotency and significant therapeutic potential but their derivation requires the destruction of early embryos, an issue that has raised ethical concerns (5). Adult stem cells and induced pluripotent stem cells provide better alternatives that are ethically preferable but have technical constraints. Although hailed as a therapy to degenerative diseases and genetic disorders, the stem cell research has brought moral issues on the subject such as embryonic life and reproductive limits, thus necessitating a strong ethical system especially one that has religious inclination such as the Islamic viewpoints.

Science, Ethics, and the Need for Moral Frameworks

Although scientific development is methodologically value-neutral, there are serious ethical consequences to its use, especially when it touches on genetic material manipulation and development (6). These interventions have brought about the issues of human dignity, moral responsibility and the boundaries of the scientific authority. Even though modern bioethics can solve these issues using the four principles, namely, autonomy, beneficence, non-maleficence, and justice, the ethical appraisal in religious communities can also be based on theological and moral reasoning based on sacred books (7).

Islam presents a holistic ethical worldview that incorporates both scientific and moral responsibility and human well-being. Traditionally, Islamic culture has played an active role in the evolution of science, medicine, and natural sciences, viewing the acquisition of knowledge as a moral duty in cases where it was aimed at a positive goal. The Quran echoes multiple calls to humankind to study and look at the nature as an indication (ayah) of Godly wisdom (8):

“Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for people of understanding.” (Quran 3:190)

These readings provide an epistemological basis of scientific exploration, as nature is a valid field of study, not some field that requires taboos.

Islamic Ethical Principles Relevant to Biotechnology

The Islamic bioethics in the basis is pegged upon the aims of Islamic law, especially the conservation of life, intelligence and procreation. These are the main principles of ethical dilemmas of cloning and stem cell research. Human life is sacred and it is one of the pillars of Islam as is stated in the Quran (9):

“And whoever saves one life, it is as if he has saved all of mankind.” (Quran 5:32)

Prophetic tradition also underlines the morality in conducting medical practice. The Prophet Muhammad ﷺ said (10).

“For every disease there is a remedy. When the remedy is applied, the disease is cured by the permission of Allah.” (Sahih Muslim, Kitab al-Tibb)

Medical innovation, such as advanced biomedical research, has been strongly advocated with the help of this Hadith, on the condition that such innovation will not cause unjust harm. One of the main ideas of Islamic bioethical discourse is ensoulment, comprehended according to the real Hadith at about 120 days of gestation. This distinction enables modern jurists to make a distinction between the early embryonic stages and human life which is fully ensouled in determining the permissibility of ethics.

Philosophical Insights from Nahj al-Balagha

Outside the field of jurisprudence, Islamic ethics are also enhanced with philosophical thoughts which can be observed in Nahj al-Balagha, which is credited to the Imam Ali ibn Abi Talib. The book highlights the fact that ignorance without restraint of morals breeds corruption as opposed to illumination and that people should not be arrogant just because they have intellectual strength. His statement that (11).

“Knowledge calls for action; if it responds, it remains, otherwise it departs.”

This illustrates a moral philosophy that would be of immediate use in the contemporary biotechnology, whereby scientific competency would be informed by justice, compassion and accountability. Such perspectives present an ethical approach to the evaluation of cloning and stem cell research in ways other than those of technical feasibility.

Rationale and Scope of the Study

Such a development is urgently required given the high rate of development of biotechnology which demands the incorporation of scientific rigor with the religious values in the establishment of ethical frameworks. This paper is a way of connecting modern biotechnology with the Islam ethical reasoning by discussing cloning and stem cell research in terms of Quranic guidance, Prophetic traditions, classical Islamic jurisprudence and philosophical views in terms of Nahj al-Balagha. It tries to show that Islamic ethics can not impede the gains of science, but it provides a solid guideline that would allow biotechnological innovation to benefit human wellbeing without compromising the morality of science.

The Pursuit of Knowledge and Islam

The access to knowledge and application of reason are the fundamental components of Islamic intellectual tradition that was firmly rooted on the quest of understanding the divine revelation and the natural world. Instead of placing science and religion on opposite poles, Islam offers us a whole epistemology where the empirical enquiry is applied in the context of a moral system. It is an excellent ethical and intellectual framework on which to approach the modern sciences, such as biotechnology, cloning, and stem cell research.

The Centrality of Knowledge in Islam

Islamic theology and civilization make the concept of knowledge (ilm) one of their central priorities. The Prophet Muhammad ﷺ was commanded to read and learn as the first revelation (12).

“Read in the name of your Lord who created, created man from a clinging substance. Read, and your Lord is the Most Generous who taught by the pen, taught man that which he knew not.” (Quran, 96:1-5)

This text defines knowledge acquisition as a divinely approved act and classical scholars have interpreted this text to also include all good forms of knowledge including natural and applied sciences. The Quran goes ahead to promote the place of knowledge by saying (13).

“Are those who know equal to those who do not know?” (Quran 39:9)

These verses stress that knowledge (ilm) is not limited to religious studies, but it goes further to consideration of nature and biological life processes, which are directly applicable to biotechnology.

Reason as an Instrument of Ethical Inquiry

In addition to knowledge (ilm), Islam also highly values reason (aql), which, having to think over, and be rational in its attitude to the natural environment. The Quran states (14):

“Indeed, in the creation of the heavens and the earth, and the diversity of your languages and colours, are signs for those who possess reason.” (Quran 30:22)

Rational inquiry is depicted in these exhortations as a religious duty. Islamic reasoning works in harmony with revelation, and it allows them to make moral judgments and apply them in practical situations. Reason (aql) plays a fundamental part in biotechnology in assessing risks, benefits and moral boundaries which are in line with the Islamic ethical judgment compared to the modern bioethical principles of proportionality and avoidance of harm.

Prophetic Tradition and Scientific Inquiry

Scientific and medical research is also justified by the Prophetic Sunnah. Prophet Muhammad ﷺ said (15):

**“Allah has not sent down a disease except that He has sent down for it a cure.”
(Sahih al-Bukhari)**

This Hadith has been noted as a call to explore biological processes and come up with health care cures. The learning value as a moral value is also highlighted in another narration (16):

“Whoever travels a path seeking knowledge, Allah will make easy for him a path to Paradise.” (Sahih Muslim)

These traditions collectively define scientific inquiry as a morally significant practice when done with ethical intent (niyyah) and care of human wellbeing.

Islamic Philosophy and the Moral Purpose of Knowledge

Ethical oriented knowledge was always a focus of Islamic philosophers. Al-Farabi, Ibn Sina and Al-Ghazali argued that knowledge can only be valuable when it is geared towards the common good. This is a strong theme expressed in Najh al-Balagha as Imam Ali admonishes that knowledge without ethical restraint would subject one to corruption instead of enlightenment. These lessons are especially applicable to the field of biotechnology where technical expertise can be advanced at a faster rate than moral consideration.

Implications for Modern Biotechnology

Combined do the Quranic stress on knowledge and the method of rationality promoted by reason (aql) and the ethics taught by the Prophet and the philosophers create a complex code of scientific ethical progress. In the same context, biotechnology is not considered as an encroachment on the sovereignty of God but rather, a discovery into the codes of creation. Islamic ethics therefore interacts positively with cloning and stem cell research by evaluating intention, benefit and harm constructively through principles and putting scientific inquiry as an act of stewardship (khilafah) to reduce suffering and human dignity.

Ethical Foundations in Islamic Thought

Islamic ethics is a moral framework that is ethical in character based on divine revelation, rationalist thought and jurisprudential method as opposed to a response to

scientific revolution. In the biotechnological context, it offers a consistent appraisal concept that is balanced between scientific progress and moral responsibility. This paradigm is based on the Quran, the Prophetic Sunnah and classical Islamic philosophy with a special reference to the aims of the Islamic law, human dignity, stewardship and avoiding harm.

Human Dignity and Sanctity of Life

The Islamic bioethics is based on human dignity. The Quran confirms the high level of morality of mankind (17):

“And We have certainly honoured the children of Adam, carried them on land and sea, provided them with good things, and preferred them over many of those We created.” (Quran, 17:70)

This principle puts human life as a moral entity as an important trust and not a biological being. Cloning and embryonic stem cell research under the biotechnological practices should therefore be evaluated with regards to whether they uphold or degrade intrinsic human dignity. The scholars of Islam note that scientific intervention is morally dubious when it commodifies human life or undermines the moral limits upon which identity and value are founded.

Stewardship and Moral Responsibility

The idea of stewardship in the Quran positions humans as custodians of the world and not sovereign lords of the world (18):

“Indeed, I am placing upon the earth a vicegerent.” (Quran 2:30)

Stewardship involves modesty, responsibility and good ethics. In this sense, scientific competence does not turn unrestricted domination over biological life justifiable but creates a duty to make sure that the intervention of technology is directed to fulfill justified human requirements and not to cause any harm. Biotechnology is an area where this principle is especially applicable, and ethical permissibility cannot be based on technical feasibility.

Objectives of Islamic Law

The objectives of Islamic Law is a methodological system of ethics used by Islamic jurists to judge biomedical innovations. In these goals, we have the safeguard of life, intelligence, offspring, faith and property. The protection of life, intellect and lineage is most directly involved in cloning and stem cell research. Although forms of cloning that are therapeutically used to heal an individual can possibly coincide with such aims, reproductive cloning is a highly ethical issue because it interferes with lineage, kinship and social structure. The strategy enables Islamic bioethics to be flexible without sacrificing fundamental ethical values.

Prevention of Harm and Promotion of Benefit

In Islamic jurisprudence, there is a guiding principle, which says (19):

“There should be neither harm nor reciprocating harm.” (Sunan Ibn Majah, Kitab al-Ahkam)

This principle puts into priority prevention of harm, proportionality and benefit evaluation. The biomedical interventions should prove excellent therapeutic benefit and should not cause disproportionate harm. In stem cell studies, this has seen researchers differentiate what is acceptable ethically like adult stem cell use and what is ethically questionable like the unreasonable killing of embryos.

Relevance to Contemporary Biotechnology

All these ethical bases prove that Islam is not against biotechnology as a science but demands that it should be morally based. The Islamic ethics offers compelling guidelines to assess cloning and stem cell research by providing principled criteria to assess the Islamic ethics of such studies, focusing on dignity, stewardship, and harm prevention, and justice to ensure that scientific development brings an improvement in human welfare without abusing moral accountability.

Islamic Ethical Perspectives on Cloning

One of the most problematic areas of the modern biotechnology is cloning because it influences reproduction, genetic identity, and the origin of human beings directly. The Islamic ethics approaches to cloning are conducted based on an evaluative approach of the Quran, the Prophetic Sunnah, the purpose of Islamic law and rational approach to ethics. Islamic scholarship does not take a blanket stance and approaches the matter of forms and purposes of cloning, but permissibility is evaluated based on the chief criteria of intention, method, and consequence.

Scientific Classification of Cloning

Cloning belongs to the scientific category of procedures that are artificially engineered to give life. In modern biomedical science, cloning falls into three categories, namely gene cloning, therapeutic cloning and reproductive cloning. The Islamic ethical discussion is more concerned with the therapeutic and reproductive cloning because of its direct consequences to human life, generation, and moral accountability. Although the cloning of genes is not a matter of ethical concern overall, reproductive and therapeutic cloning needs to be subject to close morality review.

Reproductive Cloning: Juristic and Ethical Objections

The clerical Islamic scholars and juristic councils are in overwhelming opposition to reproductive human cloning. Among the main arguments is the interference with lineage which is the fundamental goal of the Islamic law. The Quran stresses on natural reproduction by divine relations (20):

**“O mankind, fear your Lord, who created you from a single soul and created from it its mate and dispersed from both of them many men and women.”
(Quran 4:1)**

Reproductive cloning breaks the biological connection between sexual reproduction and lineage, resulting in the legal and social uncertainty, which is averse to Islamic law. It also poses a danger to human dignity, by turning them into the biological copy

or experimental results, which contrasts with the Quranic declaration of intrinsic human value.

Scientifically, reproductive cloning is associated with a lot of risk such as genetic defects and developmental deformities. according to the Prophetic maxim (21):

“There should be neither harm nor reciprocating harm.” (Sunan Ibn Majah, Kitab al-Ahkam)

Islamic jurisprudence believes that these predictable damages are enough to warrant prohibition and hence the inadmissibility of reproductive cloning to guard life.

Therapeutic Cloning: Conditional Permissibility

On the contrary, therapeutic cloning is treated with more subtlety. It is not to have human reproduction but to derive the pluripotent stem cells and treat serious diseases. Other Islamic theorists allow therapeutic cloning provided that it entails a clear therapeutic purpose, no ensoulment, proven medical value and moral supervision. This stance can be correlated with the legal doctrine of necessity and benefit which can justify limited actions if harm is minimised.

Moral and Ensoulment of the Embryo

Another important ethical aspect of Islamic cloning discussion is ensoulment which according to authentic Hadith takes place at around 120 gestational days. Before ensoulment, embryonic life is given a moral respect and not full human status making it possible to conduct limited research under strict conditions. The embryo is granted the full protection of a moral person after ensoulment, thereby greatly limiting what can be done to it.

Divine Creation and Human Agency

The cloning process is mostly viewed as playing God in the minds of the people. Islamic theology opposes this description by acknowledging that man acts in divinely ordained natural laws as opposed to being the creator of life on his own (22):

“Such is Allah, your Lord; there is no deity except Him, the Creator of all things.” (Quran, 6:102)

Although cloning does not compete with the divine creation, the Islamic ethics shows that the technical ability does not confer the moral authorization that supports the difference between scientific possibility and moral permissibility.

Stem Cell Research under Islamic Ethics

Stem cell research is one of the most promising and at the same time the most ethically sensitive fields of the contemporary biotechnology and has a potential of providing much in terms of regenerative medicine and treatment of diseases and raises some moral concerns. The Islamic bioethics assesses the research of stem cell based on a delicate system that considers the origin of stem cell, developmental age, treatment purpose, and possible harm. Instead of taking an absolutist approach, Islamic ethics uses principled reasoning that is based on revelation, jurisprudence and moral philosophy to differentiate ethical practices that are permissible and those that are problematic.

Scientific Overview of Stem Cell Research

Stem cells are self-renewing, undifferentiated cells which can differentiate into specialized cell types. They are divided into embryonic stem cells (ESCs), adult (somatic) stem cells, and induced pluripotent stem cell (iPSC). Besides being broad pluripotent and therapeutic, ESCs are generated through destruction of early-stage embryos, which presents ethical issues. The alternatives are adult stem cells and iPSCs, which have relatively less ethically controversial options, but potentially have technical constraints.

Sanctity of Life and Moral Gradation

According to Islamic ethics, human life is sacred, as it is stated in the Quran (23).

“And whoever saves one life, it is as if he had saved all of mankind.” (Quran 5:32)

Meanwhile, the Islamic jurisprudence acknowledges the moral gradation in the formation of embryo. According to the true Hadith, ensoulment (nafkh al-ruh) is conceived to be at some 120 gestation days. Before ensoulment embryonic life is

given moral but not full human status and is permitted to be the subject of limited research under close ethical supervision. Once ensoulment has taken place, embryonic or fetal life must not be destroyed unless there is a necessity of extreme need.

Acceptable Sources of Stem Cells

Islamic bioethics distinguishes the research on stem cell mainly by origin. Adult stem cells and umbilical cord blood are considered very ethical since they do not require any harm to embryos and is in line with the purpose of saving life. Embryonic stem cell studies are the most debatable, with researchers who condone it introducing harsh restrictions such as pre-ensoulment, lack of artificial embryo creation to use in research, true therapeutic intent, and consent. The creation of the iPSCs has been widely embraced, since it goes a long way and avoids moral issues related to the destruction of embryos.

Intention and Prevention of Harm

The moral analysis of Islam has intention. The Prophet Muhammad ﷺ said (24):

“Actions are judged by intentions.” (Sahih al-Bukhari)

Therefore, stem cell studies are morally justifiable in case they are conducted with therapeutic and human good in mind but not as a means of exploitation or immoral experiment. Prevention of harm is also a central concept in the Islamic jurisprudence, and must be assessed rigorously in terms of risk, scientifically validated and proportional. This would bring Islamic ethics in close relation to modern day biomedical ethical standards of clinical research and patient safety.

Islamic Ethics and Modern Biotechnology; Philosophical Integration

The ethical appraisal of contemporary biotechnology cannot be achieved by just technical evaluations or by independent legal decisions but by a unanimous philosophical approach which combines the scientific capacity with the ethical significance. Such a framework is provided through Islamic ethics which brings together revelation, reason and moral purpose. Biotechnology in this combined vision

is not only a set of experimental methods but a human moral activity that resides within a larger context of the meaning of life, responsibility, and stewardship.

Knowledge, Power, and Moral Responsibility

The learner is expected to possess understanding of the knowledge, power, and moral responsibilities within the learning process. One of the main philosophical issues in biotechnology is the increase of human dominance over the biological life. Cloning and manipulation of stem cells are some of the techniques that allow the unprecedented interference with nature. Islamic ethics does not criticize the scientific power itself but stresses that its morality orientation is conclusive. Quran directly associates knowledge and responsibility (25):

“And do not pursue that of which you have no knowledge. Indeed, the hearing, the sight, and the heart-about all those ones will be questioned.” (Quran 17:36)

In this view, scientific knowledge is an entitlement not a trust. Biotechnology should hence not be judged by what it can accomplish, but on the reasonableness of its objectives and methods and this questions purely utilitarian methods of simply focusing on the end (results) rather than the moral cost.

Harmony Between Reason and Revelation

The next suggests that there is harmony between revelation and reason. The Arabic epistemology does not support the dichotomy of faith and reason but the complementation of both faith and reason. Revelation offers moral guidance and reason allows contextual implementation (26). The basis of ethical deliberation is scientific evidence, which is inadequate without minding to human dignity, will and the long-term effect on society. The Islamic ethics can respectfully address the emerging biotechnologies without the use of extreme literalism or mindless zeal.

Moving to an Integrated Islamic Bioethical Model

The combination of Islamic ethics and the contemporary biotechnology create a bioethical model that does not oppose the scientific process, but there is no possibility

of ethical crime. It confirms moral good of scientific investigation under the guidance of intent, fairness, and benevolence and sets principled boundaries, which will prohibit harm and moral decline (27). The Islamic ethics can make a positive contribution to the field of bioethics by referring to biotechnology as a form of stewardship, which can prove that ethical consideration is not an obstacle to innovation, but a condition of its sustainability.

Modern Problems, Politics and Government

Although there is a wide range of ethical compatibility between Islamic and contemporary biotechnology, it still suffers serious challenges in translating normative guidance into practice. One of the main issues is the fact that biotechnological innovation often outpaces ethical consideration, regulatory readiness, especially in stem cell treatment, gene editing, and experimental cloning (28).

The other issue is that bioethical power is dispersed in the worlds of the Muslim majority. The disparities in the legal frameworks, institutional capacity, and academic interpretation usually lead to the discrepancy of biomedical research regulation. To bridge such gap, there is need to organize a concerted effort by scientists, Islamic jurists, ethicists and policymakers to provide structures of governance that are scientifically sound and ethically sound.

Another ethical issue is in commercialization. Profit-based models will pose the risk to commodify biological material, increase inequality in access to therapeutic treatment, and exploit vulnerable groups. The Islamic ethics that has its foundation in justice and the common good is warning against putting the market interests on top of the moral responsibility. Therefore, advocates of Islamic bioethics ensure preventive regulation whereby they encourage research, which is ethically acceptable, like adult stem cells and induced pluripotent stem cells and discourage the practice that jeopardizes human dignity, lineage, or life (29). The principles have been used in Muslim societies but have been generalized to be of value in the bioethical discourse of the world by counteracting the shortcomings of more utilitarian or market-driven models.

Conclusion

This paper has shown that Islam offers a well-rounded and ethical system that has the potential to interact in a positive manner with contemporary biotechnology especially in cloning and stem cell studies. Islamic doctrines promote exploration of knowledge and rational questioning at the same time demanding moral responsibility and human wellbeing.

Based on Quran, authentic Hadith, classical Islamic jurisprudence and philosophical understanding of Nahj al-Balagha, the discussion depicts that Islamic ethics side with biotechnological innovation if it does not violate human dignity, or cause harm, safeguard procreation, and when it is based on real therapeutic aims. The varying Islamic position that does not allow reproductive cloning but conditional on therapeutic cloning and stem cell research indicates subtlety of ethics as opposed to dogmatic nature.

Islamic ethics provides a morally sustainable view of the scientific development by presenting biotechnology as an act of stewardship (khilafah) and not domination. By incorporating these ethical principles into research regulation and policy, it is possible to make sure that biotechnological innovation should enhance not only technical capacity, but also ethical principles, and finally lead to results that will really benefit the humankind.

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