



Relationship between Genomics & Islamic Bioethics: Challenges and Remedies

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Keywords:

Genetics, Genomics,
DNA, HGP, Islamic
Bioethics, *Qurān* &
Sunnah, Islamic
jurisprudence.

Abstract:

This paper explores and attempts to correlate the scientifically diverse functions of the field of genomics, its extraordinary similarity to principles observed within the wonderful *Qurān* & the *Sunnah* and the ethical implications that include genetic development. The researcher compared numerous relevant articles that examined passages from the *Qurān* and *Sunnah* with modern-day ideas in genetics/genomics, such as dominant-recessive alleles, genetic shape, genetic counselling, maternal genetic contribution, gender-based chromosomes, same-species genetics, gender determination, and the hypothesis of the “every disease has its cure.” A fresh perspective and a holistic interpretation of the knowledge of Islamic Holy text uncovers references to ideas of genetics that predate modern-day medical discoveries. This highlighted the essential need for similarly conducting an investigation into the viable correlations still yet to be determined among expanding knowledge of biotechnological advancement and the established facts of religion.”²

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² Qur'an 41:53.

Introduction

We are at a time of exponential increase in knowledge of swiftly evolving technology. Especially such biotechnology when it entails human subjects poses ethically, legally, and religiously complicated problems. Worldwide health authorities are increasingly more involved in the concerning number of the excessive rate of births with genetic problems or preventable diseases, especially in growing countries wherein Muslims are a majority. Therefore, it is vital to deeply examine the available methods of prevention and control of genetic disorders and preventable sicknesses. A positive level of recognition is a vital requirement for the administration of care that is sensitive, in particular in Muslim-majority countries. As it is broadly understood among scholars, Islam provides a comprehensive moral, ethical, and medical framework, it is by far a religion which encompasses the secular with the religious, the mundane with the celestial and subsequently forms the foundation of the moral, ethical and even juridical attitudes and legal guidelines toward any trouble or state of affairs. Islamic teachings convey a substantial deal of instructions for health awareness and disorder prevention, including dealing with infectious sicknesses, “hereditary and genetic disorders”, consequently, we all speak to how these teachings play an essential part within the diagnostic, management and preventive measures taken consisting of: “genomic research;” “population genetic screening (pre-marital screening”, “pre-implantation genetic diagnosis”); “stem cellular therapy”; “genetic counseling” and others.³

80% of investments in genomics in early oncoming of the new century was made in the United States of America, and 80% of DNA patents in Genomics in the duration period of 1980 thru to 1993 had been held by US businesses/companies.⁴ Clinical genomics entails the application of genetic understanding and technology to unique medical and epidemiologic issues. Certain moral and legal responsibilities accompany the flood of genetic knowledge into the modern practice of genetic medicine. That is due to its 3 foremost well-known characteristics of genetic information: the consequences of genetic data are concurrently personal and familial; genetic records are often relevant to future disorders; and genetic testing frequently identifies problems for which there are not any effective remedies or preventive measures.⁵ Even though there is no one single ethical issue that unifies the field of genomics, informed consent, confidentiality and the potential for social harm and mental distress are issues that physicians worried with treating patients have to understand.⁶ Essentially, the standards and additives of consent which are usually essential in Western nations are also relevant to Muslims, despite the fact that Muslims (depending on their level of schooling, heritage and subculture) will frequently need to talk over with own family members before consenting to most important procedures. Unique care should be exercised whilst the consent includes abortion, quality-of-life issues or sexual and gynecological troubles/issues.⁷

In Muslim nations, “Genomics research” desires to be measured within the context of ethics relating to tradition and religion. “The Islamic Jurisprudence Council of the Islamic Global League in *Makkah Al-Mukarama*”, Saudi Arabia often initiate meetings in conditions requiring specialist understanding (as an instance, choices regarding clinical practice, or research), the somewhat novel concept of a “consensus

³ Al-Aqeel, Aida I. "Ethical guidelines in genetics and genomics. An Islamic perspective." Saudi medical journal 26, no. 12 (2005): 1862.

⁴ Advisory, Organització Mundial de la Salut, and World Health Organization. Genomics and World Health: Report of the Advisory Committee on Health Research. World Health Organization, 2002.

⁵ Burgess, Michael M., Claude M. Laberge, and Bartha Maria Knoppers. "Bioethics for clinicians: 14. Ethics and genetics in medicine." CMAJ 158, no. 10 (1998): 1309-1313.

⁶ Etchells, Edward, Gilbert Sharpe, Phil Walsh, John R. Williams, and Peter A. Singer. "Bioethics for clinicians: 1. Consent." CMAJ: Canadian Medical Association Journal 155, no. 2 (1996): 177.

⁷ Daar, Abdallah S., and A. Khitamy. "Bioethics for clinicians: 21. Islamic bioethics." Cmaj 164, no. 1 (2001): 60-63.

edict" (fatwa): an authoritative ruling on a factor of Islamic law is preferred. For rulings concerning medicine those consensus businesses will normally include a vast and numerous representations of “*Ulemā*” (Muslim Jurists) and professional, clinicians and scientists from relevant disciplines, the latter accountable for presenting the vital historical context and background.

Significance of the Topic

In 1990, ceremoniously the Human Genome Project (HGP) was finally fully inaugurated with the ambitious intention to sequence the 3 billion letters of genetic code within our personal human genome. It became apparent in the course of this project that the experts realized the need for having a community to answer the complex ethical questions that might be raised through such powerful advancements in biogenetic tech. For this reason, the moral, legal and Social Implications (ELSI) program was released. Five percent of the whole HGP funds range became dedicated to this application. From an Islamic religious attitude, the ELSI assignment was not considered a hit as it was influenced into more often than not ruled by western governance and no worldwide opinion had an effect influence or regulation. Therefore, the Islamic discussions on the ethical repercussions of the HGP and genomics in popular terms had been initiated earlier than the crowning glory of the scientific studies of the HGP as despite the fact that the studies took years to complete even as the ramifications of such technology could be fast drawing close. These discussions were initially brought up only by Qatar and Saudi Arabia.⁸

Then quickly after the Islamic Corporation For “Medical Sciences (IOMS)”, primarily based in Kuwait, which turned into a permanent installation and pillar in 1981, become concerned and remains considered the highest authority in regard to answering bioethical questions globally and with benefit. For the duration of those conferences, the answers to bioethical questions were discussed the use of the method of impartial and important reasoning (ijtihad). Under this, Muslim non secular scholars approached the Quran and Sunna and interpreted the meanings of the texts in regard to the bioethical implications of the programs of genomics. In 1998, throughout the seminar on “moral Implications of modern-day studies in Genetics”, organized by using “the faculty of technological expertise at the University of Qatar”, the discoveries of human genome undertaking were first analyzed from an Islamic point of view. Furthermore, the international locations that hosted a lot of those occasions, especially Qatar and Saudi Arabia, additionally installed countrywide genome tasks themselves, each in December 2013. This suggests that the conflation of genomics and ethics, which we have gotten to see in the HGP, endured in the projects taking vicinity within the Muslim world. The Quran is complete of expertise approximating our current knowledge of human genomics. The factor to notice right here is that Quran was revealed to us 1400 years, in the time when there had been no technology and appreciably less cognizance with regards to human biology, yet it incorporates the knowledge that modern scientists have just relatively recently uncovered with the assistance of cutting-edge technology. This highlights the authenticity of Islam as a faith of knowledge and expertise within humanity and its internal mechanisms, offering proof for a grand design in creation.

Methodology

To accomplish the objectives of this study, the method used is by qualitative methods. The methods used in this research are literature and library based, World Wide Web, article, journal and data analyzed with document analysis method. Collecting data from various articles of genomic and Islamic ethical significance which used and analyzed The Qur’an and the Hadiths of the Messenger Muhammad ﷺ, in-which they were screened for valuable links to modern genomics. Specifically, in-which the texts were

⁸ Ghaly, Mohammed. "Islamic ethics and genomics: mapping the collective deliberations of Muslim religious scholars and biomedical scientists." In *Islamic ethics and the genome question*, pp. 47-79. Brill, 2018.

analyzed and deliberated upon for the key topics of genetic knowledge, disease prevention and possible bioethical guidelines.⁹

Findings

DNA and Its Structure

Allah says in the Holy Quran:

سَأُرِيهِمْ آيَاتِنَا فِي الْأَفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ يَتَبَيَّنَ لَهُمْ أَنَّهُ الْحَقُّ أَوَلَمْ يَكْفِ بِرَبِّكَ أَنَّهُ عَلَىٰ كُلِّ شَيْءٍ شَهِيدٌ¹⁰

“Soon We will show them Our signs in the (furthest) horizons (of the universe) and their own souls, until it becomes manifest to them that this is the Truth”

The part of the verse which says “their own souls” refers to the human DNA and Allah refers to it as one of His signs for those who observe. The structure of DNA, its length and how it fits in such minuscule cells, the information it contains; the number of hair follicles that grow on our skin, every unique human fingerprint pattern, the possible diseases a person can be affected by all this in a single DNA strand cannot be done by a mere human being. This confirms the existence of a higher being who is all knowing and all aware of all things with the intent of a magnificent design within our code.

The Holy Quran also focusses on the replication of DNA. The Quran says, “Who created you, then made you complete, then made you symmetrical?”¹¹ This verse highlights the first step in the replication of DNA after the original DNA molecule is unwound and free from its double helical structure and separated into two polynucleotide strands. The word “symmetrical” refers to the complementary base pairing in the DNA itself. A nucleotide forms a pair with its complimentary nucleotide (adenine nucleotide pairs with thymine, whereas nucleotide guanine pairs with cytosine) by the action of enzyme DNA polymerase links the side-by-side nucleotides together which results in a new overall symmetrical polynucleotide strand. In continuation to this verse, the Quran says, “Into whatever from He pleased He constituted you”, this describes the very next step of replication. The old polynucleotide strand and the new polynucleotide strand are held side by side, where covalent Hydrogen bonds are formed between then by the action of enzyme Ligase. This results in the formation of two new symmetrical DNA strands.¹²

Embryo and its Sex Determination

In another verse, the Quran mentions

يَا أَيُّهَا النَّاسُ إِنَّا خَلَقْنَاكُمْ مِنْ ذَكَرٍ وَأُنْثَىٰ¹³

“O you people! surely, We have created you from a male and a female”

This clearly indicates that an offspring is made from sperm (of a male) and ovum (of a female) which allow the interaction of chromosomes of both male and female. 23 chromosomes from both male and female combine to produce a human offspring who has 46 chromosomes. In this way, the child inherits characteristics from both his parents. The study genetics has also made it possible for a person to know the gender of the child and how genes interact to produce that specific gender. In 1905, the great scientist

⁹ Ghareeb, Bilal AA. "Human genetics and Islam: scientific and medical aspects." The Journal of IMA 43, no. 2 (2011): 83.

¹⁰ Qurān 41:51.

¹¹ Qurān 82:7

¹² Kaushik, Mahima, Shikha Kaushik, Kapil Roy, Anju Singh, Swati Mahendru, Mohan Kumar, Swati Chaudhary, Saami Ahmed, and Shrikant Kukreti. "A bouquet of DNA structures: Emerging diversity." Biochemistry and biophysics reports 5 (2016): 388-395.

¹³ Qurān 49:13.

Edmund Beecher Wilson discovered that the 23 pair of the chromosome are a combination of either XX or XY chromosomes. We were made in pairs as stated in the Qura

Maternal Genetic Contribution

Moving on, The Quran and the Hadith also give a higher rank and genetic significance to a mother than a father. The Quran says

14 *وَوَصَّيْنَا الْإِنْسَانَ بِوَالِدَيْهِ حَمَلَتْهُ أُمُّهُ وَهْنًا عَلَىٰ وَهْنٍ وَفِصَالُهُ فِي عَامَيْنِ أَنِ اشْكُرْ لِي وَلِوَالِدَيْكَ إِلَيَّ الْمَصِيرُ*

“And We have enjoined man in respect of his parents — his mother bears him with fainting’s upon fainting and his weaning takes two years — saying: Be grateful to Me and to both your parents; to Me is the eventual coming”

This is not always seen as ideal, because of the mother’s sufferings and pains that she has to undergo at the same time as protecting and gestating a child in her womb. The genetic parts of an offspring also favor that of a mother. Cytoplasm carries “maternally inherited mitochondria, which include tiny circular DNA molecules that contain 37 of our genes. Similarly, that is especially true in male offspring who inherit their lengthy sex chromosome X from their mothers however their short sex chromosome Y from their fathers. The X chromosome is much larger (154,913,754 base pairs versus 57,741,652 base pairs) and incorporates many more significant and vital genes (1,846 versus 454) than the Y chromosome”. Further adding to the more genetic pool, organelles inclusive of” mitochondria”, “mRNA molecules”, and other determinants living within the cytoplasm of unfertilized oocytes (of a mother) are transmitted to the zygote.¹⁵

Role of Prevailing And Recessive Alleles

The true Hadith of the Holy Prophet (PBUH) additionally supply us the information about early knowledge genomics. The following narration highlights that the recessive alleles of a gene can turn out to be dominant in an offspring after many generations: “There came someone to the Prophet ﷺ from Banu Fazara and stated: My wife has given delivery to a baby who's black, whereupon Allah’s Apostle ﷺ said: Have you ever any camels? He said: yes. He again said: what is this [sic: read their] shade? He stated: they are red. He stated: Is there a dusky certainly one among of them? He stated: yes, there are dusky ones amongst them [.] He said: How has it come about? He said: it is far possibly the strain (‘irq) to which it has reverted, whereupon he (the Prophet) said: it is perhaps the stress (‘irq) to which he (the kid) has reverted.” The above Hadith specializes in the fact that the genetic trends that have been recessive in mother and father can revert and reappear as dominant tendencies within the offspring. The reversing of an allele does not simply only affect a person’s skin shade but can also bring about many genetic diseases which include sickle cell anemia and can impact a person’s senses and personality. In another narration, the prophet (PBUH) says:

16 *تخيروا لنطفكم فإن العرق دساس*

“Choose well your mate (for your semen) as (the hidden) traits can reappear

¹⁴ Qurān 31:14.

¹⁵ Hathout, Hassan. "An Islamic perspective on human genetic and reproductive technologies." Eastern Mediterranean health journal= La revue de sante de la Mediterranee orientale= al-Majallah al-sihhiyah li-sharq al-mutawassit 12 (2006): S22-8.

¹⁶ اشتهر على ألسنة عاقدى الأنكحة في خطبهم حديث: (تخيروا لنطفكم فإن العرق دساس)، والبعض يقول: (نَزَاع)، والحديث بهذا اللفظ غير محفوظ، والمحمفوظ هو: "ما أخرج الحاكم في المستدرک على الصحيحين، كتاب النکاح، قال: حدثنا علي بن عيسى، ثنا إبراهيم بن أبي طالب، ثنا عبد الله بن سعيد الكندي، ثنا الحارث بن عمران الجعفري، عن هشام بن عروة، عن أبيه، عن عائشة رضي الله عنها، أن رسول الله صلى الله عليه وسلم قال: "تخيروا لنطفكم، فانكحوا الأكفاء، وأنكحوا إليهم"، ثم قال: هذا حديث صحيح الإسناد، ولم يخرجاه"

The word “*irq* could mean traits or genes, while the word *dassās* is used to designate the behavior of human traits that skip a generation but reappear in the next”.¹⁷

Genetics Of Same Species

One of the major rules of genetic breeding to produce a fertile offspring is to ensure that the parents are off the same speciation. Breeding two different specie produces an infertile offspring just like mule which is man-made from breeding of male donkey and a female mare. The Quran also emphasizes on the same species being together. The best example of this is the Prophet Noah’s ark when Allah ordered the animals of the same type to be paired together. The Quran mentions in a verse “*Construct the Ark within Our sight and under Our guidance. Then when comes Our command, and the fountains of the earth gush forth, take on board pairs of every species, male and female, and your people except those of them against whom the Word has already been issued: and address Me not in respect of those who are unjust; for verily they shall be drowned (in the flood)*”. In this verse, the word “pair” emphasizes that reproduction can only occur in pairs.¹⁸

Hypothesis of “Every Disease Has It’s Cure”¹⁹

The early Muslim scholars had understood the significance of gaining knowledge and they were considered the pioneers in numerous arenas of science including medicine. They were the medical scientists, who believed in the hadith of Prophet Muhammad (peace be upon him) which states; "There is no disease that Allah has created, except that He also has created its treatment."²⁰ Over the years, vaccines have succeeded in preventing numerous cases of communicable diseases and their complications resulting in reduction of disabilities and millions of lives were saved. Hence, it has been pointed out that vaccinations could be the “cure for every disease” that was mentioned in the Quran, but this is still yet unfounded and needs further in-depth analysis to be confirmed or denied.

In addition, medical studies, mainly known as biomedical studies, play an important role in the advancement of knowledge in the medical field. Medieval Arabic was considered as a scientific medium. It is said that knowledge from Adam has doubled in the next eight years. In this new world, most Muslim countries have not yet been developed or are underdeveloped. They were divided into fifty countries on the basis of ethics, politics and tribes. Energy spent in research and development is spent in overcoming its domestic and small differences within nations. They lag behind in the fundamental pillars of development (education, science, technology, research and development). This can be attributed to either lack of funds or lack of scientific leadership in the nation.²¹

In 2008, “the Scientific Medical Applied Research and Development (SMARD) Company was launched as Qatar’s first biotechnology and clinical studies enterprise/company”.²² In previous years, Oman called for an influx of worldwide investment in medical studies along with H1N1

¹⁷ Islam, Kabirul. "Allele-specific chemical genetics: concept, strategies, and applications." ACS chemical biology 10, no. 2 (2015): 343-363.

¹⁸ Alam, Mohammad Shafiqul, Takeshi Igawa, Md Mukhlesur Rahman Khan, Mohammed Mafizul Islam, Mitsuru Kuramoto, Masafumi Matsui, Atsushi Kurabayashi, and Masayuki Sumida. "Genetic divergence and evolutionary relationships in six species of genera *Hoplobatrachus* and *Euphlyctis* (Amphibia: Anura) from Bangladesh and other Asian countries revealed by mitochondrial gene sequences." Molecular Phylogenetics and Evolution 48, no. 2 (2008): 515-527.

¹⁹ حَدَّثَنَا مُحَمَّدُ بْنُ الْمُثَنَّى، حَدَّثَنَا أَبُو أَحْمَدَ الرَّيْبِيُّ، حَدَّثَنَا عُمَرُ بْنُ سَعِيدٍ بْنِ أَبِي حُسَيْنٍ، قَالَ حَدَّثَنِي عَطَاءُ بْنُ أَبِي رَجَاحٍ، عَنْ أَبِي هُرَيْرَةَ. رَضِيَ اللَّهُ عَنْهُ. عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ " مَا أَنْزَلَ اللَّهُ دَاءً إِلَّا أَنْزَلَ لَهُ شِفَاءً "

Sahih al-Bukhari, Vol. 7, Book 71, Hadith 52.

²⁰ Sahih Al-Bukhari, Book #71, Hadith 582, Narrated by Abu Huraira.

²¹ Tadmouri, Ghazi O., and Nisrine B. Tadmouri. "Biomedical research in the Kingdom of Saudi Arabia (1982-2000)." Saudi Med J 23, no. 1 (2002): 20-24.

²² Al-Bishri, Jamal. "Evaluation of biomedical research in Saudi Arabia." Saudi medical journal 34, no. 9 (2013): 954-959.

vaccines. In African Muslim nations, Tunisia had the biggest variety of PubMed guides. Using nuclear generation for clinical studies by Pakistan and Iran has galvanized the western international purview. Lately, Iran is investing in Stem cellular studies and thus far, they were successful in isolating 6 human and 8 mouse embryonic stem cell lines. In 1997, 50 billion rials were invested in research in medication in Iran. Alternatively, Pakistani Scientists have made historic achievements in mapping the primary Pakistani genome. On this regard, they have come to be first within the Muslim global to map the primary genome of a Muslim man.²³

The United States is still leading the sector in medical research due to the fact the full expenditure for American medical research has doubled within the relatively short span of 10 years. The identical is the case with other self-appointed developed nations. Now it is the responsibility of Muslim international countries to conduct studies for the benefit of humankind so we may finally fulfil the expertise of a cure for each ailment that befalls us.²⁴

Conclusion

In conclusion to this article, Islamic bioethics and genomics form an integral part of the earthly existence of human beings. Knowledge about genomics tells us about ourselves, the diseases we'll inherit, our eye color, our body orientations and even of our possible expiration date. Islamic bioethics, on the other hand, gives us a crucial method of understanding and relating to every second, day, month and year of our existence. The Islamic code of ultimately life tells us how to spend our lives in a morally, spiritually and personally significant way. The Qur'anic text is the epitome of science and ethics before such concepts existed in our vocabulary. As seen in this article, an In-depth study of Qur'anic verses and Hadith unveiled with the help of Islamic laws called Sharia, answers to all the bioethical quarries raised regarding genomics. Genomics is a vast, relatively still young and exponentially growing field of science, and the *Qurān* points out the bases of major sub fields of genomics. It is paving a way for scientists and researchers to observe and strengthen in their belief of signs of Allāh as Allāh says in the *Qurān* "There are signs for those who observe". As genomics is a magnificent and one of the most powerful/dangerous sub-fields of biology, which can alter and merge a human genome with an animal genome and create a completely different species or which could create a genetic disease to wipe out humanity in a matter of months, therefore, to prevent these advancements being used for the purpose of harming and disturbing peace and prosperity of society, Islamic bioethics are necessary. It is the sole responsibility of every individual as a person, a friend, or a partner to observe these bioethics and guide others to follow them too so that the future of humankind is one where we no longer live in fear of death from ailment.

²³ Deleu, Dirk, Margaret G. Northway, and Yolande Hanssens. "Geographical distribution of biomedical publications from the Gulf Corporation Council countries." *Saudi medical journal* 22, no. 1 (2001): 10-12.

²⁴ Malik, Tayyaba Gul. "Muslims and the medical research: past, present, future." *Oman Medical Journal* 26, no. 6 (2011): 383.