DNA Technology and Maqāṣid al-Sharīʿah: Establishing Halal and Tayyib Compliance

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Abstract

By leveraging their social and intellectual development, humans have unlocked novel ways to exploit the resources of the universe, resulting in cutting-edge technologies that, while improving daily life, often repudiate the purposes of the religion (Maqāṣidu-sh-Sharīᶜah). Deoxyribonucleic Acid (DNA), autopsy, Human cloning, IVF, surrogacy, biotechnology, autonomous vehicles are prominent instances of these latest technological breakthroughs. The discovery of DNA by Swiss chemist Friedrich Miescher in the late 1860s paved the way for innovative medical and forensic applications. Moreover, the integration of DNA can pointedly contribute to the attainment of the fundamental purposes of Islamic law which include protection of religion (ḥifsu-d-Dīn), human life (ḥifsu-n-nafs), mental faculties (ḥifsul ᶜAql), dignity (ḥifsu- ᶜirḍ), progeny (ḥifsu-n-nasl) and property (ḥifsul-māl). This article explores the viability of DNA technology integration, while also delving into the varied opinions of Muslim scholars, some of whom contend that the susceptibility of DNA to errors impedes absolute reliance. While protecting the fundamentals and classical aspects of Islam, Muslim scholars should not categorically decline modern trends simply because they are modern. Rather, they should observe areas where they can use these trends to promote a deeper understanding of Islam. More importantly, they should be among the active stakeholders of these modern developments to clearly outline the religious boundaries.

Keywords: DNA, technological breakthroughs, forensic applications, *ḥifsu-n-nasl*, *stakeholders*

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https://doi.org/10.58932/MULJ0011

Introduction

The divine foreknowledge of Almighty Allah has ordained that some people, irrespective of their worldly success and riches, will remain discontent and instead encroach upon the properties, lives, and dignities of others (Chapra, 2008). To mitigate this, Allah has established strict boundaries to serve not only as a way of life but also as a deterrent against such contraventions (Tahir & Sohail, 2012). Numerous divine books sent by Almighty Allah prior to the final message delivered by Prophet Muhammad have consistently emphasized the paramount importance of justice (Mawdudi, 2001).

The pursuit and establishment of justice (*ᶜadl*) among people takes a vital position in the practical application of Islam. Both the Qur'an and Prophetic traditions underscore the importance of justice in numerous verses and *'aḥādīth* (M. M. Rahman, 2024). The Qur'an, in particular, unequivocally reinforces this notion in Sūrah Al-Mā'idah. "O you who believe! Be upright for Allah, bearers of witness with justice, and let not hatred of a people incite you not to act justly; and justly, that is nearer to piety, and be careful of (your duty to) Allah; surely Allah is Aware of what you do" (Q5:V8).

To safeguard the interests of all human beings especially Muslims, their scholars undertook an examination of the essential objectives of Islam, through which they converged on the understanding that the primary purpose of religion is to protect five crucial human needs, which include protection of religion, life, properties, progeny and dignity, encapsulated within the concept of '*Maqāṣidu-sh-Sharīᶜah*' (Nawawi, 2024).

The uncontrolled utilization of technology and social media in some countries has created an extensive platform for some individuals with mischievous intentions to commit crimes even from the comfort of their own residences (Willemo, 2019). The alarming surge in murder cases and property violations is a pressing concern (Chatterjee et al., 2022). Many of these crimes are intricately planned, often leaving only DNA technology as the key to uncovering the complexities (Odah, 2024).

On this note, DNA technology is an innovative solution developed by scientists, tailored to address a myriad of challenges such as (i) medical issues through genetic testing and diagnosis to identify genetic disorders and predispositions, (ii) forensic issues through which crime scene is investigated by examining DNA evidence to ascertain suspects and solve crimes, likewise paternity testing which is done by discerning biological relationships through DNA analysis (Lazer, 2004).

Despite the considerable benefits that both *Maqāṣidu-sh-Sharīᶜah* and DNA technology offer humanity, their advantages are often commonly contradictory across numerous domains (Baharuddin et al., 2015). This inconsistency stems not only from the different entities that conceived them but also from the separate scopes and limitations that distinguish each. It is against this backdrop that this

article discusses the exploration of DNA technology as a modern way of realizing the purposes of Sharīᶜah (Shabana, 2012).

DNA Technology

Deoxyribonucleic acid, commonly known as DNA, is a foundational molecule that encompasses the genetic instructions that inform the development and functionality of all living organisms (James, 2016). DNA is an essential element of cells, playing a crucial role in the transmission of genetic information from one generation to the other (Esiobu et al., 2022).

DNA, as described by James Watson and Francis Crick is a double helix structure, wherein two complementary strands of nucleotides are intertwined through hydrogen bonds between base pairs which enable DNA's self-replication during cell division, thereby ensuring that genetic information is passed on precisely (Crouse, 2007).

It is defined by Scientific Community as an extensive polymer comprised of nucleotides, each incorporating a phosphate group, a sugar molecule, and one of four nitrogenous bases (guanine, adenine, thymine and cytosine) (Watson & Crick, 1953). This complex molecular structure operates as the primary genetic material, carrying guidelines for development, growth and function in living organisms (Macgregor Jr & Poon, 2003). Moreover, DNA can be regarded a blueprint or instruction manual that comprises the necessary information for the function and development of all living organisms (Shute et al., 2000). DNA is often termed as the "code of life" as it encloses the genetic instructions that govern the traits and characteristics of an organism (Guttman et al., 2011).

All the living organisms are made up of tiny units called cells, which are the elementary structural and functional units of life. Most cells have a centre known as the nucleus that controls all the cellular activities (Crick, 1982). Within the nucleus, there are chromosomes that contain DNA (Deoxyribonucleic Acid), a molecule that has genes that control specific characteristics of an individual. These chromosomes exist in pairs, half of them is gained from each parent, which results in an exceptional blend of maternal and paternal characteristics (Khanna, 2007). Although some children may possess other characteristics quite distinct from both parents, which is a result of recessive traits or genetic mutation of one of the parents, these traits can become manifest and dominant, even if they were not obvious in either parents (Saraswat et al., 2009).

According to Leslie, the notion that English physicist Francis Crick and American biologist James Watson discovered DNA in the 1950s is a misconception (Olby, 1970). DNA was first identified by Swiss chemist Friedrich Miesher in the late 1860s (Dahm, 2005). Subsequent to Miesher's discovery, other scientists, notably Erwin Chargaff and Phoebus Levene, conducted extensive studies that exposed additional details about the chemical composition and molecular structure of DNA (Dahm, 2008a). Their pioneering work laid the foundation for later breakthroughs which include Crick and Watson's ground-breaking conclusion in

1953 that the DNA molecule occurs in the form of a three-dimensional double helix (Dahm, 2008b).

Islam and DNA Technology

Islam is a religion that emphasizes the importance of acquiring knowledge that is beneficial and edifying, particularly when it promotes the advancement of human dignity and foster equity as well as justice among individuals (Yasin & Jani, 2013). Therefore, the discovery of DNA fingerprints can be regarded as one of the signs of Almighty Allah, as posited by Saᶜdu-d-Dīn Hilālī in explication of the Quranic verse:

سنريهم آياتنا في الآفاق وفي أنفسهم حتى يتبيَّن لهم أنَّه الحق أو
لم يكف بربك أنه على كل شيء شهيد

We will soon show them Our signs in the Universe and in their own souls, until it will become quite clear to them that it is the truth. Is it not sufficient as regards your Lord that He is a witness over all things?

Just as relatively recent discovery of DNA fingerprints and their distinctive characteristics, which was once considered amazing and enigmatic, has become a widely accepted fact, similarly, this genetic fingerprint represents today a sign among the signs of Almighty Allah (Verma, 2006). This scientific phenomenon assists individuals to detect factual information in an empirical and tangible manner which facilitates the establishment of truth and justice in society (Hilālī, 2000).

While affirming that Islam does not condemn the usage of DNA as evidence (Korbatieh, 2020), and acknowledging a common legal maxim stating, "The basic principle regarding beneficial things is permissibility," the Muslim scholars cite numerous Quranic passages and prophetic traditions, which are as follows:

هو الذي خلق لكم ما في الأرض جميعا ثم استوى إلى السماء
فسواهن سبع سماوات وهو بكل شيء عليم

> He it is Who created for you all that is in the earth, and He directed Himself to the heaven, so He made them complete seven heavens, and He knows all things. (Q2, V29)

عن أبي ثعلبة الخشني عن النبي (صلى الله عليم وسلم) قال: "
إن الله فرض فرائض فلا تضيعوها ، وحدَّ حدودا فلا تعتدوها ،
وحرَم أشياء فلا تنتهكوها ، وسكت عن أشياء رحمةً لكم من
غير نسيان فلا تبحثوا عنها.

Abū Thaᶜlabah Al-Khushanī narrated that the Messenger of Allah said, "Allah has laid down certain duties which you should not neglect, and has put certain limits which you should not transgress, and has forbidden certain things which you should not disobey, and has kept silent about other matters out of mercy for you and not out of forgetfulness, so do not seek to investigate them (Hanbal, 2001)."

Muslim scholars interpret this Quranic verse and the prophetic tradition to suggest that the use of DNA fingerprint is neither explicitly authorised nor prohibited by Almighty Allah and His Messenger, falling instead within the categories of matters about which they remained silent (Chaabani, 2019). As such, they argue that DNA can be used as an evidence. While concurring with the implication of the Ḥadīth, Ibn Rajab outlines that all the injunctions of Allah can be categorized into four types: obligation (*farā'iḍ*), prohibition (*maḥārim*), limitation (*ḥudūd*) and matters left unaddressed or silent about (*al-maskūt ᶜanh*) (Shabana, 2014).

Objectives of Islamic Law (*Maqāṣidu-sh-Sharīᶜah*)

Muslim scholars assert that understanding the objectives of Islamic law is pivotal to grasping the very essence of Islam. This ability is fundamental for an effective application of Islamic jurisprudence which can facilitate achieving the human interests in this world and the hereafter (Weiss, 1998). Imām Al-Juwainī emphasizes that whoever is oblivious of the objectives of Islamic law does not have insight into the complete framework of Islamic law (Al-Raysuni, 2005). Shaykh Ibn Taymiyyah expounds that Islamic law was instituted to simplify the realization of benefits as well as the prevention of harm (Hussein, 2018). Furthermore, he underscores that a reflective understanding of these objectives reinforces Muslims conviction in their religion which can also equip them with intellectual weapon to counter any doubt or uncertainty (Mala & Hunaida, 2023).

In contemporary times, understanding objectives of Sharīᶜah is of paramount importance, as it abridges not only the core boundaries of Islam but also unveils its intrinsic beauty. *Maqāṣidu-sh-Sharīᶜah* offers an insightful jurisprudential perspective which serves as a benchmark to appraise novel developments and technologies to determine their potential to either damage humanity or foster its value and advancement (Kolmek, 2025).

Moreover, the objectives of Islamic law are categorized into three based on their strength and significance: (i) the essential objectives (*Al-Maqāṣid Aḍ-Ḍarūriyyah*) they are the necessary objectives essential for human well-being and the preservation of society, (ii) the complementary objectives (*Al-Maqāṣid Al-Ḥājiyyah*) they are the objectives that aim to assuage difficulties and improve human life, (iii) and the embellishment objectives (*Al-Maqāṣid At-Taḥsīniyyah*) these are the objectives that focus on achieving beauty, perfection, and betterment in human life (Al-Raysuni, 2005).

Among the three aforementioned objectives of *Sharīᶜah*, the essential objectives (*Al-Maqāṣid Aḍ-Ḍarūriyyah*) stands out as the most superior. This is because it offers wide-ranging protection for five crucial aspects that are vital to the life of every human being, specifically; protection of religion, human life, mental faculties, progeny and property (Kamali, 1999).

These five aspects of life are universally acknowledged by Muslim scholars as the fundamental objectives of Islam (Chapra, 2008). Unfortunately, they have

been compromised in the digital age due to the advent of modern trends, advancement in technology and social media, which, despite providing several opportunities, have also exposed humanity to negative consequences (Pavlik, 2008). Thus, to effectively protect these vigorous aspects of life in accordance with religious prescriptions, numerous tools are required in the modern landscape, among which DNA is deemed essential (Fleising, 2001).

DNA as Maqāṣidu-sh-Sharīᶜah's Enforcement

In Islamic jurisprudence a myriad of evidence is considered to determine the outcome of a certain case. This evidence can be categorized as (i) word evidence or confession (i*ᶜtirāful-jānī*), (ii) evidence of eyewitness who should be reliable (*ṣādiq*) and honest (*ādil*), and rational evidence provided during the hearing of a case. Moreover, other types of evidence are discovered in the modern time which serve as material evidence attained by samples from the site as well as their forensic test. This last category is the foundation of some new development and technologies such as autopsy, Facial Recognition Technology, Stable Isotope Analysis, Proteomics, Drones and Aerial Imaging and DNA (Baharuddin et al., 2015).

However, the implementation of DNA fingerprints as a tool for enforcing *Maqāṣidu-sh-Sharīᶜah* hinges on fulfilling the four conditions and mechanisms outlined by Professor Eric Lander (Lander & Weinberg, 2000). Based on his experimentation in European and American courts, these conditions must be met to ensure efficacious integration of DNA technology in Islamic law and *Maqāṣidu-sh-Sharīᶜah* enforcement. These conditions are summarised as follows:

- General acceptance by specialists: this means that scientific findings should not be incorporated into experimental practices until they have successfully passed the meticulous stages of validation and practical application.
- Dual-Sampling: this means that two analyses should be conducted on separate samples to ensure comparison and ensure the integrity of the result.
- Technical Competence: Familiarity with technical equipment involves the safety of the devices and the proficiency of the technicians.
- Caution regarding the advanced technology: a cautious approach to the usage of the advanced technology must be put up which includes critically evaluating its mechanisms and outputs before accepting its results in order to ensure reliability and objectivity (Lander & Weinberg, 2000). As noted earlier, upon fulfilment of these conditions, DNA can efficiently function as a viable adjunct to protection of the five aforementioned crucial aspects of human life in *Maqāṣidu-sh-Sharīᶜah.*

Protection of Life (*Ḥifsu-n-Nafs*)

The preservation of life is a fundamental objective of Islamic jurisprudence which entails safeguarding one's right to live, dignity, safety and honour (Ebrahim, 1998). In furtherance of preserving human life, Islamic law has established a range of rulings, including the prescription of retaliatory justice (*qiṣāṣ*), the prohibition of homicide, and the ban on disfigurement and mutilation. Additionally, it stipulates

penalties for highway robbers, belligerents, and those recklessly endanger human life (Pitchay et al., 2018). Moreover, it bans practices such as genetic tampering, organ trafficking, unauthorized dissection and human cloning. On a complementary note, it enjoins individuals to nurture their bodies with nutritious food, drink and medical treatment (Elmahjub, 2021).

On the order hand, DNA can contribute to this course through (i) Medical research by advancing human understanding of genetic diseases which can enable the development of targeted medical treatments and therapies, (ii) Forensic investigations by identifying individuals while solving crimes and exonerating the innocent which can lead to establishment of justice and protection of human life, (iii) Predictive medicine by identifying inherited disorders through genetic testing which can call for early intervention and preventive measures (Nakamura, 2009).

Protection of Mental Faculties (*Ḥifsul ᶜAql*)

Islamic law highlights the preservation of intellectual faculties as its third key objective, showing the significance of intellect across various contexts and circumstances (Muslehuddin, 1973). By rendering intellect a condition for moral and legal accountability, Islamic jurisprudence places great concern and importance on the rational faculties which serve as a foundation for understanding and applying the divine law that administers the universe and the human condition (Elmahjub, 2021).

Likewise, Islam has methodically safeguarded the human intellect by prohibiting some substances and behaviours that may impair cognitive integrity, such as stimulants, intoxicants, narcotics as well as anything that dissuades the mind from its ideal functioning (Ahmed et al., 2018). Furthermore, it emphasizes the significance of knowledge acquisition, dissemination, intellectual discourse and universal access, while denouncing ignorance and illiteracy which is considered detrimental to human mind as it can lead to its corruption and unwelcome outcomes (Rahman & Mohamed, 2022).

Similarly, DNA technology can significantly contribute to protection of human intellect through (i) Genetic predisposition understanding by knowing the genetic factors that foster mental health conditions which may help individuals taking preventive measures, (ii) Research advancements by studying genetics which may lead to new treatments and therapies (Deary et al., 2009).

Protection of Progeny (*Ḥifsu-N-Nasl*)

Preserving lineage, which means the procreation and reproduction to populate the universe, emphasizes the importance of a legitimate and structured family unit (Serour, 2008). This Islamic approach differentiates human reproduction from mere animalistic societies, rampant in some permissive environments where familial bonds; origins, descendants, fathers or children, are not legally regarded. In such societies, some individuals may live their entire lives without knowing their parental or familial lineage (Kanwal et al., 2025).

Thus, to protect human lineage, Islam encourages legal marriage, alleviating its burdens, and simplifying its financial obligations which can be illustrated in one

of the Prophetic traditions, "the most blessed marriage is the one with the least expense (Hanbal, 2001)." While advocating for the adoption of virtuous ethics and condemnation of vices, indecencies and egregious conducts, Islam also sets punishments for deviants who engage in non-conformist sexual activities, such as sodomy, adultery or lesbianism (Wahid, 2002).

From the DNA technological contribution, this pivotal aspect of life can be protected through (i) Maternity and paternity testing by confirming biological parentage with high accuracy to certify the exact identification of both parents and children. This can be particularly beneficial in avoiding mix-ups or identification of offspring, (ii) Forensic analysis by identifying and prosecuting individuals who engage in illicit activities against children to provide protection and justice for defenceless populations, (iii) Genetic disorder screening by identifying genetic transformations that may be passed on to children. This would allow the parents to make cognisant decisions about birth spacing or seek genetic counselling (Vazharova & Kremensky, 2016).

Protection of Property (*Ḥifsul-Māl*)

Protection of property, in Islam, entails a multi-layered approach as it includes strategic growth, prudent management, and attentive preservation against potential diminishment, losses, or erosion of wealth. Financial resource, as aptly described, is the bedrock of all productive endeavours, thus it was regarded as a fundamental consideration in Islamic jurisprudence (Setiono et al., 2025).

To show the significance of its protection and management, Islam, encouraging individuals to engage in productive work, it prohibits extravagance, wastefulness, and inattentive expenditure of wealth (Islam, 1999). Likewise, it forbids theft, fraud, usurpation, usury, bribery, and all forms of unfair exploitation or acquisition of others' assets. Furthermore, in a clear consent, Islam pronounces the punishments and penalties (*ḥudūd*) for the perpetrators of unjust wealth. The harshness of these penalties reflects the gravity of the crimes, with punishments such as amputation for theft and severe penalties for highway robbery in accordance with Islamic jurisprudence (Bishin & Cherif, 2017).

From modern technological development, DNA can be used to enforce the protection of property which is, as early stated, one of the fundamental purposes and objectives of Islamic law (McFerrin, 2012). This can be done through (i) Property marking by applying a DNA code to valuable items which can make them certainly traceable, (ii) Crime scene investigation by collecting DNA evidence from property crime scenes which can lead to identify the suspect and his arrest (Resnik, 2001).

Protection of Religion (*Ḥifsu-d-Dīn*)

As all the fundamental purposes of Islamic law are inextricable linked, it is impractical to prioritize one aspect without concurrently addressing the others (Abdel & Tarshany, 2016). This nexus is exemplified by intricate relationships between protection of religion (*ḥifsu-d-Dīn*), and mental faculties (*ḥifsul ᶜAql*), as well as interdependence of protection of progeny (*ḥifsu-n-nasl*) and property (*ḥifsul-*

māl). Ultimately, all these fundamentals and elements converge in the protection of religion, which is regarded as the pinnacle among others (Kamali, 1999).

As highlighted earlier, the development of DNA technology can play different roles in safeguarding various aspects of fundamentals of human life, such as property, sanity, progeny and property (Modell et al., 2020). By protecting the former, DNA technology concurrently contributes to the preservation of religion, as the security of life and mental stability is an essential necessity for the safeguarding of progeny, property as well as the religion (Peters et al., 2008).

Conclusion

The swift proliferation of technology globally is driven by the imperative to enrich human existence. However, some Muslim scholars still express reservations about assimilating modern innovations with religious tenets, primarily due to some disparities and their Western origins. DNA technology, in particular, which has been in existence for decades, presents noteworthy potential for advancing the objectives of religion. Contrary to the common delusion that DNA testing is exclusively used to detect the paternity in cases of marital dissonance which stems sometimes from infidelity, this article explicates that DNA can also be utilized to screen for genetic syndromes among prospective parents in order to identify potential risks of transmission to their children.

Islam, often misinterpreted as primitive or rigid, is in fact a religion that inspires knowledge acquisition and exploration of the universe even before anyone thought about modern discoveries. Despite limitations in accuracy, DNA can double as valuable tool in fostering property security and human safety if properly and religiously handled by Muslims.

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