

**Review article**

**CRISPR Cas-9 genome editing and Islam: A religious perspective**

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**Abstract**

**Background:** Certainly, the ultimate aim of Islamic law is to “protect human life” either through mitigation of hardship or recognition of public interests reckons biomedical innovations allowable where-if cling by ethical, moral and legal principles. Assertively, if-CRISPR Cas-9 genome editing-methods based on the guided principles of Islamic law and jurisprudence, as “harm has to be redressed” can be justified keeping in view the human dignity, honor and prestige. Hence, newer technologies can be adopted because “necessity renders prohibited things as permissible” with certain caveats. Arguably those who consider it as an evil must think over that “in the presence of two evils, the one whose injury is greater is avoided by the commission of the lesser”. **Conclusion:** Therefore if Cas-9 based method leaning towards evils, even then it can be acceptable in case where an atypical germ-line sequence can affect the next generation, which is indeed a great evil, and “the lesser of evils is preferred over the greater one” renders it permissible with a view it might enhance human health and living standard. Conversely, curing a minor disease if causing another equal infirmity or greater should be rendered forbidden as “harm cannot be removed by harm”, then, “a greater harm can be removed by a lesser one” germ-line editing/alteration in severe cases will be allowed on the basis of necessity.

**Keywords:** Crispr and Islam; Bioethics; Germ-line modification; Genome editing and Religion

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**Introduction**

Generally, human life is valuable because of the special place enjoyed by them amongst all the creatures. Thus love for humanity is considered to be the foundational norms of morality in general and medical ethics in particular. Therefore, *Shariah* stresses on the redressal of harm: “*Annoy them not so as to restrict them*” mean “*not to make their life miserable*”. The ‘*ahkam*’; commands of *Shariah* are totally based on ease, convenience, facilitation and removal of hardship. Various verses of the holy *Quran* are evident as “*Allah intends every facility for you: He does not want to put you in difficulties*”. Further “*Allah doth not wish to place you in difficulties*”. While another verse clearly indicating that “*On no soul doth Allah place a burden greater than it can bear*”. Equally “*Allah tasks not a soul beyond his capacity*”. For this purpose, the holy *Quran* says: “*And has imposed no difficulties on you*”. Evidently,

religion emphasizes on facilitation and removal of hardship. Therefore, the Prophet Muhammad (peace be upon him) said that: “*Religion is facility the most beloved religion to God is tolerant orthodoxy*”. He also said that: “*Behold, this religion is very easy*”. Consequently, the role of scientists/physicians is to improve the living condition with an aim to attain the objectives of nature. So the possibility of healthy living standards is the ultimate goal of Islam and in any religion.

**Balancing views**

Presently, scientists urge that genome editing technology developed with a sole purpose to prevent harm/disease in order to improve human lives. If the aim/purpose is to assist humanity, it can be recognized in Islamic law, because “laws are designed to protect benefits and to facilitate the improvement and perfection of the conditions of human life”. Thus Islamic law aims to fulfill two primary purposes,

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first: to secure the interests of man in the Hereafter, secondly: to preserve/protect human life in this world. Hence for the protection of these purposes, the '*Maqasid al Shariah*' (primary objectives of Islamic law) works by preserving (*ibqa*) that benefit of mankind and protecting (*hifz*) by repelling actual or expected danger or '*mafsadah*'.

Securing benefits and repelling harm is also justified by the Prophetic traditions, and can be governed through the well-established legal maxims. Further, to bring healthy and peaceful environment for any sect of the society, enhancement in medicine and medical technology is prerequisites, and hence it is necessary as an obligation due to a golden rule, "*anything necessary for fulfilling an obligation is itself obligatory*". Equally adoption of new methods, scientific tools/techniques for the welfare of human beings, to protect their life, health and intellect directly comes under the rubric of objective of *Shariah*.

#### **Objectives of Islamic law and its role**

When we look towards Islamic law; particularly to the '*maqasid*', we can find that after 6<sup>th</sup> century of *hijrah*, the requirement to use new tools/techniques, like exercising '*ijtihad*' (exertion); where in case to address new problems that did not have direct solutions in the primary sources of Islamic law (the holy *Quran*, the *Sunnah*/Prophetic traditions, *Ijma*/consensus, and *Qiyas*/analogy) was very essential to meet the overwhelming public needs and unattended problems arising in the society. Thus, '*maqasid al Shariah*' is one of the most significant of these tools to address new issues, and it was in fact '*Imam al Ghazali*' who expanded '*Imam al Juwayni's*' ideas that underlied the concept of '*maqasid al Shariah*'. The jurists have classified '*maqasid*' into three types: First: '*daruriyyath*' (necessities); secondly: '*hajiyyath*' (needs); and thirdly, '*tahsiniiyyath*' (luxuries). Hence, "the *Shariah* as a whole seeks primarily to protect and promote these essential values and validates all necessary measures for their preservation and advancement".

#### **Prerequisites; the case of necessity**

Subsequently, we must decide first the extent of necessity while doing medical experiments. In Islamic law the notion of repelling harm and acquiring benefits for the human life, health and happy environment are necessary components, which can accurately attain through modern medical technology. Physicians are under obligation to use all possible methods for curing, safety and wellbeing

of humanity. It is because that treatment itself recognized by Islamic law, and in case of necessity, for the survival of an individual, can get treatment by unlawful substance/medicine. Thus '*removal of harm*' is allowed and even "*a greater harm is to be removed by a lesser harm*" keeping in view that "*removal of harm is greater than attaining of an interest*" in Islamic law.

#### **Protection of life and objective of Islamic law**

Assertively, protection of life is one of the prime objectives of *Shariah*. Various verses of the holy *Quran* are evident of that: "*If any one saved a life, it would be as if he saved the lives of the whole people*". While another Verse says: "*And makes not your own hands contribute to (your) destruction*". Keeping in view these verses, physicians are under obligation to save humanity in general and their health and life in particular. Similarly the Prophetic tradition "*harm is not allowed*" also signifying the prevention of all forms of injuries, and equally it implies to human life and health. As "*protection of human life*" is one of the primary objectives of *Shariah*.

Certainly, the ultimate aim of the Islamic law is to "protect human life either through mitigation of hardship i.e. lifting a burden or recognition of public interest" as "*hardship begets facility*". Thus, biomedical innovations like CRISPR Cas-9 are undoubtedly lawful, if such methods cling by ethical, moral and legal principles related to retaliation of harm and securing of benefits. Moreover a legal maxim "*harm has to be redressed*", clearly indicating that harm is to be removed regardless of the nature of the harm, can also be a justifiable ground keeping in view the human dignity, honor and prestige. Further on the basis of legal principle "*necessity renders prohibited things as permissible*" numerous Muslim scholars issued legal edicts in favor of biomedical technologies. Hence adoption of biomedical technologies are permissible but with necessary guidelines. Therefore, it is mandatory for the physicians and experts to have enough knowledge while conducting experiments, due to Prophetic tradition: "*Anyone who practices medicine but is not known as a practitioner, and kills a human being or inflicts harm on him, will be held responsible*".

#### **Germ-line editing, and its justification**

Perhaps, gene editing can be justified on various grounds, e.g. where in case a woman facing embryonic setback, then treatment of-course by any means is not only necessary but mandatory, as protection of the progeny is one of the primary objectives of *Shariah*.

That is why the Prophet Muhammad (peace be upon him) indicated toward women's fertility. He said: "*Marry women who are loving and very prolific i.e. fertile*". Equally, fertility of both male and female is requisite for the establishment of a family, because human beings are created from both male and female. Allah says: "*we created you from mingled sperm*".

#### **Prerequisites; semen and religio-jural views**

Generally in all religions, the sperm and egg in its initial stages are considered '*drops of water*', and in this sense it does not carry any life or personality. In Islamic law, for instance, the jurists of '*Hanafi*' and other '*Sunni*' schools were allowed abortion/modification on justifiable grounds within 120 days after conception. But if there is a prominent threat to the progeny due to an injured fetus or embryo containing lethal diseases, which is likely passed to the next generation, then fetal can be destroyed before and even after four months (120 days). Whereas the '*Maliki*' jurists hold that fetus-uprooting and aborting is prohibited after it reaches to 40 days. Although some '*Sunni*' jurists and '*Shia*' making distinction in between the normal sperm drop with those that form an embryo insight the womb.

Consequently, if uprooting of the fetus is allowed in view of these prominent schools, then why not genetic modification and editing in the reproductive cells that cannot carry any life? Even though, modification for the therapeutic purpose is permitted in view of these schools. Same is the case in *Judaism* and *Christianity*; where in *Jewish* law sperm is considered like '*water*' till 40 days and it cannot carry any life. So, in case of threat to woman's life/health, fetus-uprooting is not only necessary but an obligation. Hence, any research involving reproductive cells or embryonic stem cells research for advancement of therapeutic purposes is permissible. Where in *Christianity* some are opposing reproductive innovations, particularly human embryonic stem cells research, while others hold, any advancement in the field of biotechnology that involves modification in reproductive cells, will be permissible if it is used for therapeutic purposes.

#### **Prerequisites; religion on coitus interruptus**

Normally in Islam, contraceptive techniques are allowable on the basis of Prophetic traditions, as He allowed '*coitus-interruptus*'. Hence, the discussion is turning around on the issue "whether or not the sperm is the source of life, and whether semen destruction/modification would be permitted in Islam?", because "pregnancy occurs in a result of assembling of man's sperm (*nutfah*) with that of woman". The human

genealogy is clear from various verses of the holy *Quran* and Prophetic traditions. However, "abortion is allowed at any stage, if mother's life is in danger, since the protection of mother's life is preferred over an embryo".

In fact contraceptive technique is permitted because '*nutfah*' does not carry life in its initial stages, even if it is established that sperm carries life, whilst the embryo facing fatal disease/s and needs modification or where the mother's health necessitates to abort the fetus completely, then such cases render abortion permissible. In case of modification or abortion, apparently there is a conflict of interest between the mother life with that of an embryo forming a baby. So in such situation whose right should prevail? Therefore in the preview of an Islamic legal maxim: "*in the presence of two evils, the one whose injury is greater is avoided by the commission of the lesser*", the rights of mother shall preferred over an embryo as "*the lesser of evils is preferred*", protection of mother's life is much necessary than that of an embryo. Thus modification and further changes are allowed as per Islamic law.

#### **Prerequisites; alteration in germ-line**

Certainly islamic scholars view that '*disfiguring Allah's creature*' is tantamount to devilish work, thus any change in human body is rendered to be the handiwork of devil in preview of the holy *Quran*, as it says: "*I will command them so they will slit/cut the ears of cattle, and I will command them so they will change the creation of Allah*". While commenting on this verse, '*Qaiser Shahzad*' stated: "according to prominent *Quran* exegetes, altering primordial nature (Islam) to polytheism, and in his opinion alteration includes human and non-human realms, thus alteration is not limited to religious belief but the physical nature of creatures is also in question".

Possibly in our understanding; manipulation/alteration in nature is not completely prohibited in Islam, because requisite change/modification for the betterment of humanity within the prescribed limits is permitted. While some contemporary scholars erroneously using the verse (*disfiguring Allah's creature*) in order to condemn modern medical technologies. Thus genetic modification can be used for all those purposes if there is no diabolic change in nature.

Resultantly, germ-line editing/alteration will be considered legal, as in reality it does not change the nature, provided that such shall not involve third

party gametes or germ-line sequences without a legal bond. However if any change occurs, it would be presumed as preordained. Because the Prophet said: “Allah has written whom He is going to create till the day of resurrection”. While Qaza’a companion said that I heard from ‘Abu Saeed’ saying that the Prophet said: “No soul is ordained to be created but Allah will create it”. Resultantly modification in the germ-line can never change the God’s creation, as He said: “No one can change the creation of God; so the pattern on which He has made mankind, No change in the work of Allah”. It means whatever God wants to create, He can do it and according to his Will, hence no one can change the God’s creation.

#### **Prerequisites; religion on gender selection**

Looking at the preconception gender selection, Islam does allow the couple to make their choices. Since male progeny is considered one of the divine blessings in the holy *Quran*. Although Islamic teachings do not permit misogamy, thus in the view of ‘Yusuf Al Qaradawi’; “PGS is allowed, although it is better not to go for it and leave the matter to God, as the power of controlling the gender lies solely with God”. The legal regime also holds the same that, in case of failure of the technology, the parents must not treat the resultant baby unjustly, as the nature may want otherwise of our choices.

In a country like Pakistan, typically if wife fails to give birth to a baby boy, then the fear from husband’s to marry a second wife always persists, and in most cases marriages are broken and wife get divorced due to infertility and embryonic problems. In these sorts of cases mistreatment (by her husband and mostly from his family) is a normal routine not only in uneducated families but also in advance societies. So keeping in view these situations, if genetic modification is permitted, then why not it’s further editing. Similarly if coitus interruption is permissible in Islam in preview of ‘Jabir Ibn Abdullah’s’ narration that: “We used to practice coitus interruptus while the *Quran* was being revealed, ‘Jabir’ added: we used to practice coitus interrupt-us during the lifetime of Allah’s Messenger while the *Quran* was being Revealed”. Then, why not modification and editing in the reproductive cells to correct the hereditary diseases at initial stages and to prevent it from being pass to the next generation?

Consequently, if an act like that was prohibited, then the Allah’s Messenger would have defiantly forbid it. ‘Ibn Muhairiz’ narrated that “me and Abu Saeed al Khudri went to the Prophet and asked about *coitus*

*interruptus*, that how can we do *coitus-interruptus* before asking Allah’s Messenger, who is present among us?” We asked (him) about it and He said, “It is better for you not to do so, for if any soul (till the day of resurrection) is predestined to exist, it will exist”. The same was narrated by ‘Abu Saeed al Khudri’ that: we were setting with Prophet, he questioned that ‘what is your opinion about coitus interrupt us?’ The Prophet said, “Do you really do that? It is better for you not to do it, no soul that which Allah has destined to exist, but will surely come into existence”. Through these traditions coitus interruption and gender selection got its validation in Islamic law. So if an act or method of birth control in which coitus is initiated but the penis is deliberately withdrawn before ejaculation is allowed, then semen/embryo in the womb can be modified for desired results. A well established *Shariah* maxim “It is a fundamental principle that a thing shall remain as it was originally” further strengthen the view of modification, since if a man is allowed to release his sperm externally, then why not permitted its editing internally.

#### **Justification of CRISPR based techniques**

Germ-line editing through CRISPR will be regarded legal, because it does not change the nature in reality. The Prophet Muhammad (peace be upon him) said that: “Allah has written whom He is going to create till the day of resurrection”. ‘Qaza’a’ another companion said: I heard from ‘Abu Saeed’ saying that the Prophet said that: “No soul is ordained to be created but Allah will create it”.

Resultantly, alteration/modification in the germ-line can never change the God’s creation. Further the holy *Quran* is evident that God is the ultimate creator and sole controller, e.g. “He created all things and thus He is the creator of all the things”. While another verse says: “Verily, all the things, have We created in proportion and measures” mean that “the God creation is not haphazard, so everything is running under law and to his Will, and nothing has happened but according to His plan, even the thoughts and actions of human have its fullest consequences because of God’s interference”. Therefore everything that occurs is happening by the Will of God,. Ultimately the God chooses as He wants, and in fact He is doing according to his own plan, and He has the knowledge of all the things, equally of those that are happening. The holy *Quran* says that: “The Lord does create and choose as He pleases” according to “His own Will and Plan, thus all creation is an act

of his Will and no one can direct him, as He has the supreme knowledge and wisdom". *'Abdullah Ibn Masud'* while interpreting this verse maintain: "In fact He creates what you do not know, and even you do not know the numbers of items which He created in this world, and what it might be for what purpose and how He creates it". Hence any modification in gene might lead to that what is not known to us, but God is aware of all and even about its procedures, since nothing is happening but in accordance to His Will.

Explaining the mentioned verse *'Imam al Qurtubi'* said: majority of the jurists hold the view that "Of creation and was told, from the types of insects and vermin in the lowest of the earth, land and sea, which has not seen by humans, and even have not heard of it". But today with the advancement of technology, somehow some of the wonders become known to the human beings, which show the creative/unique work of the God. The holy *Quran* says: "*And He has created (other) things of which ye have no knowledge*". "Until very recently many of things were unknown to humans, but through the mind and ingenuity of humans, it is Allah who creates new things hitherto unknown to human beings". Equally, God is the Guardian and Disposer of all the things: "*Allah is the creator of all things, and He is the Guardian and Disposer of all the affairs*". Further, "God has not only created all the worlds but he maintains them and cares for them, so He does not set apart from His world, thus everything depends upon Him". In the context of this verse, where if the scientists go counter to their own nature, then by doing so definitely they will lose their beautiful nature in which God created them. Although in many verses Allah showed his creative work, to let all know that no one can create the same like he created. For this purpose "wonders upon wonders are disclosed in the constitution of matter itself, the atoms, the forces of energy, and also the instincts of animals, and the minds and the capacities of man, and there is no limit to these things, as worlds upon worlds are created and transformed every moment within and presumably beyond man's vision, From what we know, we can judge of the unknown". The holy *Quran* says: "*And see how Allah did originate creations: so will Allah produce a later creation: For Allah has power over all things*". Hence, any modification in the gene will be considered as it is originally created. Moreover those who believe that, through medical technology, we can create and can control the word. In fact they

are unaware that "*Allah is the creator of all things*" for those who assigning partners due to creating anything similar to that of the God's creation, so no one is the creator except God, as He is the sole creator of all the universe.

Similarly, these modern technologies can play a vital role and may restoratively help those who have severe troubles in their reproductive cells. As we know that progeny/offspring is among the blessings of Allah almighty. The holy *Quran* says: "*wealth and sons are allurements of the life of this world*". In another place it stated: "*Allah has made for you mates of your own nature, and made for you, out of them, sons, and daughters and grandchildren*". Therefore, infertile couples can take help from biomedical technologies. Because, Islam does recognize the desires of connubial couples; the holy *Quran* indicated towards it: "*Our Lord, grant unto us wives and offspring who will be the comfort of our eyes*". Resulting offspring, despite of its sex, is considered to be the consoler of a family. That is why firm fecundity itself is a sanctified blessing of the Allah almighty. Because sterility or fertility ordained by the God itself: "*He creates what he wills, he bestows (children) male or female according to his will. Or he bestows both males and females, and he leaves barren whom he will*". Hence artificial means are allowed to counter germ-line disorders.

In the light of above discussion, we can safely argue that in abnormal situation genetic editing would be legal on the basis of necessity. Consequently, curing a minor disease, where if causing another equal infirmity or greater should be rendered forbidden as "*harm cannot be removed by harm*". Thus, gene editing if causing mental disorder, cancer and other lethal diseases which may adversely affect the newer generation, then CRISPR Cas-9 will be rendered prohibited. Otherwise "*a greater harm can be removed by a lesser one*" germ-line editing, gene modification/alteration in severe cases will be allowed. Those who consider it as an evil must think over it on that "*in the presence of two evils, the one whose injury is greater is avoided by the commission of the lesser*". Therefore if Cas-9 based methods leaning towards evil, even then it can be acceptable in case where an atypical germ-line sequence can affect the next generation and is indeed a great evil, hence "*the lesser of evils is preferred over the greater one*" renders it permissible to practice it ethically, morally, legally and religiously with a view that might enhance human health and their living standards.

**Conclusion**

Exclusively the creative power goes to God almighty alone, thus the knowledge of science and technology as regard to the determination of sex and modification in human embryos is nothing but a plain hope for humanity. Even though, due to technological advancement one can be able to know about the human genealogy, but it does not make him ascendible over and above the all. Hence, the profound cognition about the human genetics and the mysteries of human creation is for beyond the reach of mankind. Therefore, any activity through modern medical technology like CRISPR Cas-9 and other methods are merely tools and techniques. Ultimately it does not change the nature, what God wants. Only it can be a hope to act otherwise, and in

reality it is nothing more than a therapeutic practice. Consequently, let the CRISPR Cas-9 based genome editing methods be allowed provided with some conditions under the rubric of religion keeping in view the bioethical norms, and then see the results, that what scientists can accomplish after its potential application in human embryos.

**Ethical Clearance:** This article was approved by the Research and Ethics Committee of Faculty of Shariah & Law, IIU, Islamabad, Pakistan before submission.

**Competing, financial interests:**

The author declares no competing financial interests.

**Conflict of Interest:**

The author declares that he has no conflict of interest.

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