

*Invited paper*

# Human cloning: Eastern Mediterranean Region perspective

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الاستنساخ البشري: من منظور إقليم شرق المتوسط

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**الخلاصة:** تبشّر الإنجازات التي تحققت مؤخراً في حقل الجينوميات والتكنولوجيا البيولوجية بالدخول إلى عصر جديد في مجال التنمية الصحية، حيث إن للاستنساخ العلاجي إمكانات هائلة لإحداث ثورة في أساليب المعالجة الطبية. على أن تكنولوجيا الاستنساخ تحمل في طياتها إمكانية إجراء استنساخ إنجابي، الأمر الذي يثير مخاوف قيمية وأخلاقية خطيرة. ولذلك فإن من الأهمية بمكان أن تصل البلدان الإسلامية إلى اتفاق حول هذه القضية الحيوية. وإذا كان تطوير العلم والتكنولوجيا بغير تحقيق مستوى صحي أفضل يمثل التزاماً دينياً وأخلاقياً، فإن هناك حاجة عاجلة لقيام علماء المسلمين بمناقشة مسألة بحوث الخلايا الجذعية والاستنساخ مناقشة منطقية، على أن لا يُنظر في مثل هذا الحوار إلى المزايا العلمية فقط، بل يجب أخذ المُستتبعات الشرعية والأخلاقية والقيمية والقانونية أيضاً بعين الاعتبار.

**ABSTRACT** Recent advances in genomics and biotechnology have ushered in a new era in health development. Therapeutic cloning possesses enormous potential for revolutionizing medical and therapeutic techniques. Cloning technology, however, is perceived as having the potential for reproductive cloning, which raises serious ethical and moral concerns. It is important that the Islamic countries come to a consensus on this vital issue. Developing science and technology for better health is a religious and moral obligation. There is an urgent need for Muslim scholars to discuss the issue of stem cell research and cloning rationally; such dialogue will not only consider the scientific merits but also the moral, ethical and legal implications.

## Clonage humain : perspectives pour la Région de la Méditerranée orientale

**RÉSUMÉ** Les récentes avancées dans le domaine de la génomique et de la biotechnologie ont marqué le début d'une nouvelle ère dans le développement sanitaire. Le clonage thérapeutique possède un énorme potentiel pour révolutionner les techniques thérapeutiques médicales. Toutefois, la technologie du clonage est perçue comme ayant le potentiel pour le clonage reproductif, ce qui suscite de sérieuses préoccupations éthiques et morales. Il importe que les pays islamiques parviennent à un consensus sur cette question cruciale. Le développement de la science et de la technologie pour améliorer la santé est une obligation religieuse et morale. Il est urgent que les doctes musulmans étudient de façon rationnelle les questions de la recherche sur les cellules souches et du clonage ; un tel dialogue prendra en considération non seulement les bienfaits scientifiques mais également les implications morales, éthiques et juridiques.

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## Introduction

One of the greatest controversies triggered by the rapid pace of evolution in biology, particularly in genomics and biotechnology, has been the technique of cloning. The concept of human cloning has long been in the imagination of many scientists, scholars and fiction writers [1]. The basic techniques of cloning have been known for some time, and have been applied to both the plant and animal kingdoms without even stirring a ripple of concern in international conscience [2]. So long as this form of cloning (non-human) suits human needs, does not cause harm and does not conflict with religious beliefs, it has been considered acceptable.

In its simplest form, cloning is defined as the exact replication of cells. Unicellular organisms are primed to replicate (clone) themselves by nature. Multi-cellular organisms and higher species replicate naturally through a reproduction mechanism involving male and female germ cells. Cloning in higher species involves somatic cell nuclear transfer, a process in which the nucleus of a somatic (non-germ) cell is taken out and inserted into an enucleated fertilized female germ cell (egg, ovum). This cell then has the capacity to divide and grow into an exact replica of the original from whom the somatic cell was taken. That is how the first cloned sheep, named "Dolly", was created [3]. This is reproductive cloning, and can in theory be applied to any species of mammals, including humans.

We also know that within humans (and other animal species) there are cells called stem cells. These are undifferentiated cells that have not yet developed into particular types of cells in order to carry out specific functions in the body. Nevertheless, they have the DNA within their nucleus that encodes for genetic information for their future characterization as they develop;

for example a stem cell encoding for skin tissue will eventually develop into skin tissue, a stem cell encoding for heart tissue will eventually develop into heart tissue and so on. When the nucleus of a stem cell is removed and replaced by a nucleus of another cell type, the stem cell will then be reprogrammed to produce the product of the implanted nucleus, when it fully develops. This is therapeutic cloning. The stem cells possess pluripotential characteristics, and can differentiate into various cells and tissues when nurtured and grown in different culture media. The stem cells can be obtained from both adult and fetal tissues, umbilical cord and early embryos. However, it appears that the ability of the stem cells to transform is limited, except for those cells that are derived from human pre-embryos, which seem to have a high pluripotential capacity [4].

This paper outlines the debates prompted by progress in cloning research, with special reference to the Islamic perspective of the Eastern Mediterranean Region countries.

## Reproductive cloning versus therapeutic cloning: the global debate

At this time there is a global consensus across all countries, regions and faiths that reproductive cloning of humans should not be allowed. There are two main reasons. First, because the science and knowledge is limited and far too many risks are involved. Most cloned animals end in miscarriage. A significant proportion fail to develop beyond the early stages, and many are born suffering from a wide range of developmental problems and die prematurely [3]. It took 227 attempts to clone Dolly the sheep successfully.

Secondly, many scientists, bioethicists and religious scholars consider cloning procedures a danger to human identity. The concern is just not for technical or safety reasons, but a much broader set of ethical, cultural and social issues that have far-reaching implications for the centuries-old values and practices upon which humanity has survived. These include undermining the concept of reproduction and family, the ambiguity of relations of a cloned child with the progenitor, problems of personal identity and the psychological development of a clone, the disregard for human dignity, and, perhaps most serious of all, concerns about eugenics and trends towards “designer babies” and human enhancement [1]. No religion or society at this stage is prepared to allow clones of humans, and there is no ambiguity about this.

The debate regarding therapeutic cloning is, however, somewhat different. The central objective of this technique is to cure disease, improve health and hence strive for a better quality of life for humans. This calls for research and development in therapeutic cloning to improve the knowledge, skills, expertise and techniques for achieving the stated objective. The problem, however, is that therapeutic cloning requires embryonic stem cells, and to acquire these, early stage human embryos are needed. This raises serious ethical, moral and religious concerns, for example, about the rights of the embryo, the timing of the onset of life and the hazards to the woman. With widespread and unchecked use of stem cell technology, however, there is also the risk that it could fall into the wrong hands and be used for human cloning, with unimaginable consequences.

## The present situation

At present, in many countries, researchers are utilizing the unused fertilized eggs from infertility clinics for therapeutic cloning. These eggs are allowed to undergo division and development into early stage embryos, from which the embryonic stem cells are extracted. In some countries, researchers also create human embryos for the specific purpose of carrying out research into therapeutic cloning. This has been condemned by Islamic scholars. In several countries, however, this is permitted by appropriate legislation, but in others, researchers take advantage of a lack of specific regulations to continue with research in this area. As this technique is still developing, a relatively large number of embryos are required to obtain the relevant stem cells.

The issue of human cloning is indeed of global concern, and hence has been the focus of international debate. For several years now, countries have been calling for a United Nations convention to address human cloning. The issue is not about reproductive cloning, which, as already noted, everyone agrees should not be allowed. The stalemate is really between countries that favour a total ban on all forms of cloning, whether reproductive or for research into its therapeutic applications, and those that are of the view that the ban should only apply to reproductive cloning and that legislating therapeutic cloning should be left to the discretion of the countries.

Many countries consider that the need for research in therapeutic cloning outweighs the dangers that it poses and are creating favourable environments to support research and development in therapeutic cloning.

ing. Despite a European Parliament vote in November 2002 favouring a total ban on human cloning [5,6], the United Kingdom granted licences for human cloning for the purpose of harvesting stem cells [7]. Japan's top scientific council has recommended that the government allow limited cloning of human embryos for research purposes [8]. The United States of America (USA), whose government had earlier banned public sector funding for research on human cloning, has allowed limited and conditional support for embryonic stem cell research. The Arab countries have debated a region-wide ban on human cloning, whether for reproductive or therapeutic purposes [9].

At the global level, the debate on cloning has figured in the United Nations General Assembly. After long and complex discussions on the issue in 2003, the countries failed to reach a consensus [10]. However 2 years later, in 2005, the General Assembly finally adopted a resolution, containing the United Nations Declaration on Human Cloning. Eighty-five nations voted in favour of the resolution, including 24 Muslim countries (Table 1). The Declaration called on the Member States to undertake necessary measures to prohibit all forms of human cloning to the extent that they are contradictory to human dignity and the need to safeguard human life. The

**Table 1 Votes from countries from the Regional Office for the Eastern Mediterranean (EMRO) and other countries from the Organization of the Islamic Conference (OIC) on the United Nations Declaration on Human Cloning (Resolution adopted by the General Assembly in March 2005) [11]**

In favour		Against		Abstained		Absent	
OIC	EMRO	OIC	EMRO	OIC	EMRO	OIC	EMRO
Albania	Afghanistan	Gabon	–	Algeria	Egypt	Chad	–
Bangladesh	Bahrain			Azerbaijan	Islamic Republic of Iran	Gambia	
Benin	Iraq			Burkina Faso	Jordan	Guinea	
Brunei	Kuwait			Cameroon	Lebanon	Guinea-Bissau	
Comoros	Libyan Arab Jamahiriya			Indonesia	Oman	Kyrgyzstan	
Côte d'Ivoire	Morocco			Malaysia	Pakistan	Mali	
Djibouti	Qatar			Maldives	Somalia	Mauritania	
Guyana	Saudi Arabia			Turkey	Syrian Arab Republic	Mozambique	
Kazakhstan	Sudan				Tunisia	Niger	
Sierra Leone	United Arab Emirates				Yemen	Nigeria	
Suriname						Senegal	
Tajikistan						Togo	
Uganda						Turkmenistan	
Uzbekistan							

Member States were also called on to take adequate measures to protect human life and to prevent the exploitation of women in the application of life sciences as well as to adopt and implement national legislation for the purpose [11].

### Islamic perspectives on cloning

The issue of cloning within the Eastern Mediterranean Region is strongly linked to religious beliefs, and the ethical norms and values of society. It also must be viewed in the context of the technical skills, knowledge and expertise that exists currently in the Member States, and more importantly, it must also take into account the future stakes involved. Overall, progress in human embryonic cell research in the Region is weak; nevertheless, *in vitro* fertilization techniques are widely available. Many countries have well-developed facilities for embryonic cell research related to animals. In the absence of clear regulations and guidelines, the potential for exploitation and misuse therefore exists. At the same time, some Member States (as well as some other Muslim countries outside of the Eastern Mediterranean Region) are fast developing their scientific infrastructure, within which research and development for health is a major element and is gradually taking centre-stage. The overarching challenge is, therefore, to find a balance between the need to preserve human dignity and the need for continued improvement in the quality of human life through research and development.

From the Islamic perspective, the debate on human embryonic cloning hinges essentially on three key arguments:

- Does cloning conflict with Islamic beliefs and to what degree is it permitted?
- What are the consequences of cloning for society?

- At what stage is an embryo considered a living being?

The Islamic Fiqh Academy, in its 1997 meeting, agreed that cloning does not contradict the Islamic faith. God is the creator of the Universe and therefore the advancing knowledge and technology development that has made cloning possible was pre-ordained by God Almighty's will. Just as the person sowing the seed is not the creator of the resulting plant, so the cloning technician is not the actual creator of the plant or animal thus produced [12]. The scientific breakthrough in cloning can thus be regarded in a way as divine will to provide mankind with moral training and maturity [13]. There is a general consensus that cloning of plants or animals to improve quality and productivity as well as for cure of human diseases is not prohibited in Islamic law.

Muslim scholars are unanimous in their opposition to cloning of humans. There have been numerous calls for banning human cloning throughout the Muslim world by way of various *fatwa* (formal legal opinion or religious decree issued by an Islamic leader), community polls and national/international Islamic bodies [12,14,15]. The main reasons cited include the fear that man, by creating life, is attempting to play God. Only God is the Creator, not humans. It is an unnatural way of reproduction that is contrary to what God has ordained for humans. There will be loss of kinship and lineage, both of which are central and core values in Islam. Who would be the father, mother, brother or sister of the clone? Mixing of kinship or the loss of it, would be considered *haram* (unlawful) and is therefore prohibited by Islam. Cloning is also feared because of its ability to create "designer human beings", superior or inferior, depending upon the motives of the creator. This of course will be of great harm

to societies and nature. The fact is that all major religions of the world oppose human cloning [16], principally because of the fear that it would corrupt, taint or destroy traditional family relationships and lineage, that the destruction of embryos for research is tantamount to murder (in some religions), and that it meddles with God's universe in a way that humans should not.

The main concern about human cloning is, therefore, the inherent fear of the ability of humankind to regenerate itself, which obviously conflicts with the beliefs, value systems and environments within which humans have lived over the centuries of their existence. The current (but limited) state of knowledge and the high risks involved in cloning procedures and their outcomes further strengthen and justify the case against human cloning. Nevertheless, there is one common factor on which everyone agrees. And that is the desire of man to alleviate human suffering and disease. This has been a key tenet of human development throughout the ages, in all societies, cultures and religions. Throughout the Muslim world, and in all the religious *fatwa*, resolutions and recommendations against cloning, a clear message emanates: that the well-being of individual beings is sacrosanct. Islam encourages research and investigation. Modern drugs and vaccines are important discoveries that offer cure and prevention from diseases. The cloning technology now offers new ways and opportunities for disease cure. The Prophet (ﷺ) has very clearly commanded us to seek cure, for according to Abu Huraira: the Prophet (ﷺ) said, "There is no disease that Allah has created, except that He also has created its treatment." (Translation of Sahih Bukhari, Volume 7, Book 71, Number 582).

A *fatwa* by leading Egyptian Islamic legal scholar Sheikh Yusuf Al-Qaradawi,

whilst reasoning the forbidding of human cloning in Islam, stresses that Islam embraces scientific progress and research and that at no time during Islamic history has there ever been a conflict between Islam and science. Therefore, if cloning creates a human being, it is a violation of Islamic beliefs, but if it is to be used for specific parts of the human body such as the heart and kidneys, for the purpose of treatment, this is not only permitted, but recommended and rewarded by God. It is of interest to note that the members of the Islamic Fiqh Academy, in its 1997 seminar, while clearly articulating the position of the Academy against therapeutic cloning, allowed that in exceptional cases, it could be re-examined in the future, provided it is not implemented in contradiction to Islamic law [12].

From the discussion presented above, we can see that there is no disagreement on the issue when the matter relates to human cloning in Islam. There is a complete taboo and there are no opposing views on this. However, given that Islam mandates nations to pursue science and knowledge, and sanctifies the seeking of cure for human illnesses, the door for research in therapeutic cloning remains ajar. As long as the technology does not create humans, but seeks to cure disease and illness, and does not conflict with religious beliefs, it should be encouraged. The Eighth Conference of the Islamic Organization for Medical Sciences (IOMS) in Cairo in 2004 endorsed a draft of the First International Ethical Guideline of Medical Sciences from an Islamic Perspective. At the Conference, Muslim states were urged to allow the cloning of human embryos for research into possible medical treatments, i.e. therapeutic cloning, while maintaining a ban on the reproductive cloning of human beings [17].

## Religious views on the origin of life

Since stem cell research involves early-stage embryos, it is important to examine how Islam views the inception of life itself. The subject was the focus of discussion at the *Seminar on Human Life: its Inception and End as Viewed by Islam*, held in Kuwait in 1985 [18]. The participants graded inception into three clear stages. The first stage of inception is the time of fusion between the sperm and ovum into a zygote. This stage establishes the genetic code for the individual that will be created out of the zygote as it develops. The second stage begins when it settles inside a woman's body (assuming here, the womb). The third phase begins when the spirit (soul) is embedded into the fetus. This is considered to be day 120 of gestation. Some Muslims believe this to happen on day 40 of gestation. An embryo is considered a living organism from its conception and it is to be respected in all stages, especially after the spirit is breathed in. Tampering with an embryo—to cause abortion for instance—at any stage after conception is considered *haram* (unlawful) by many in Islam, except when the mother's life is in danger. Some experts believe that abortion before the 40th day of gestation, particularly when there is a justification, is lawful. It is quite clear that Muslims consider an embryo to acquire human status at the time when the spirit is breathed into it. So it can be argued at least that Islam does not totally prohibit early embryonic stage research, especially if it is justified and deemed necessary. However, the manner in which the early embryos may be obtained and the inherent risks to women who would be the source of such embryos pose serious ethical and social problems.

Most other major religions of the world hold similar views. The Roman Catholic

Church, however, vehemently opposes all forms of cloning, and does not allow any tampering with early embryos. Some leading figures among conservative Protestant churches, given the ambiguity on embryo status and the potential for health benefits, are opposed to reproductive cloning, but support therapeutic cloning. The international debate to ban all types of cloning, not surprisingly, is led by countries with a strong Roman Catholic population base and others who have similar views. The Jewish view on embryo status is akin to the Muslim view. Judaism does not consider a fertilized embryo to have a full human status and the need for research that has the potential to save and preserve life takes precedence.

The concept of life can also be seen through the prism of anatomical embryo development. Some consider an embryo to be alive when fetal movements are first noticed by a mother (at the 16th week of gestation), although ultrasound technology can visualize fetal movements as early as the 10th week of gestation. Others equate life in the embryo with early signs of heartbeat, which begins towards the end of the 3rd week of gestation. Still others would consider an embryo to be alive once the sensory systems start to develop after the 2nd week of gestation with the differentiation of the neural crest cells, the precursors of the human nervous system. In the United Kingdom, where early embryonic stem cell research has recently been legalized, the rules do not authorize embryos to be developed for more than 14 days [7].

## Conclusion

It is essential that any debate on cloning should not rest on scientific merit alone. By the same token, advances in science should not be regarded as a threat to religious belief

or as being in opposition to human values and culture. Research and science drive innovation for human development. It is important that when creative science and technology begin to impact on deeply rooted concepts of theology and culture, science and religion should engage in constructive dialogue and come to an informed consensus for the good of the public at large. In 2004, the magazine *Newsweek* reported the successful derivation of stem cells from cloned embryos in the USA [19]. The news accentuated the divide between those who believe that cloning should be outlawed entirely and those who support banning it for reproductive purposes but not for medical research. Times are changing now. Countries that strongly opposed any form of cloning at the last UN debate, such as the USA, are now repositioning their stance. The USA government has authorized limited stem cell research, and in at least one State cloning for stem cell research has been legalized [20]. Several other countries have followed suit. At the global level the number of countries that support therapeutic cloning for stem cell research while remaining opposed to reproductive cloning is growing. This has happened in the light of the emerging knowledge, promise and

renewed hope for disease cure that the technology offers.

It is important that the Islamic countries come to a consensus on this vital issue. Developing science and technology for better health is a religious and moral obligation. There is an urgent need for Muslim scholars to discuss the issues on cloning rationally, with careful analysis of the benefits and harms and resulting in a balanced outcome. The League of Arab States has also stressed the need for a regional dialogue on health care ethics and human cloning at all levels. At the United Nations many Muslim nations have now endorsed the idea. Some countries within the Islamic world are at the threshold of cutting-edge research and technology in genetics. Should we close the door to this development, without discussing all the possibilities, judging all the criteria involved and considering the potential impact for human health and alleviation of suffering?

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