

Volume 7, Issue 2, August 2010

HUMAN EMBRYONIC STEM CELL RESEARCH IN IRAN: THE ROLE OF THE ISLAMIC CONTEXT

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Abstract

Human embryonic stem cell (ESC) research is highly contentious in many societies, as it makes use of human embryos. Due to their varying socio-cultural, religious and political backgrounds, individual countries have different regulatory approaches which play an important role in international human ESC research collaborations. Thus, studying the complexity of regulatory frameworks in different parts of the world highlights differences and similarities between nations, the variety of views on specific issues, and the range of regulatory uncertainties. I will therefore review the ethical, social and legal implications of human ESC research in Iran, which has assumed a leadership role in this area among the Middle Eastern Muslim countries. In this essay, I shall first describe how human ESC research is both shaped and regulated by Islamic law and ethics. I will then discuss the current state of this field and its ethics in Iran. In conclusion, I will argue that, although both science and religion are key factors in the current debate surrounding human ESC research, additional factors influence the manner in which new knowledge is taken up in countries with the same religious background or scientific interests.

DOI: 10.2966/scrip.070210.324



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1. Introduction

Human embryonic stem cell (ESC) research has emerged as one of the pivotal aspects in the interface between scientific, religious and bioethical issues. Since the first successful isolation and culture of human ESCs in 1998, research on these cells has attracted the attention of both scientists and stakeholders. Human ESCs exhibit two major characteristics: they can renew themselves and can also give rise to specialised cells of the body. What is unique about these sorts of stem cells (SCs) is that they can develop into nearly any cell type of the human body. This new-found ability to grow human ESCs has opened the door to a generation of new remedies that might be used to treat those suffering from degenerative disorders which are currently incurable, such as Alzheimer's, Parkinson's, diabetes, heart diseases, and spinal cord injuries.¹

As human ESC research has advanced, it has raised compelling ethical issues due in part to the destruction of embryos in the process of the derivation of SCs. Beatrix P Rubin² states that “this field of research and its therapeutic hope has particularly rendered the human embryo accessible as an object both of experimental manipulation in stem cell (SC) research and of ethical debates.” The deliberation of human embryos posits a range of views on their moral status. On one end, there are those who maintain that it is morally wrong to use embryos for research that involves destroying them. On the other end, ESC research proponents who hold that it is a moral obligation to help the millions of patients who are suffering and desperate for a cure, and that early embryos that are usually leftover from in vitro fertilisation (IVF) procedures can rightly be used in this research.³

Religious groups have generally been at the forefront of those speaking out publicly for and/or against embryo research. Conservative Christian denominations believe that human life is created at conception and that embryos should therefore be treated as living human beings. In contrast, Judaism holds that an embryo does not become human until 40 days after conception, while Muslim scholars consider human life to begin when the soul enters the developing embryo or foetus, which occurs between 40 and 120 days after conception. This range of views likely accounts for different levels of acceptance of ESC research, which is supported by the Jewish community and accepted in many Muslim countries, yet is opposed by the Roman Catholic Church and some Protestant denominations.⁴

Although different religious traditions exhibit various levels of plasticity as to when life begins, human ESCs are generally accepted as a source of great potential for

¹ H Baharvand, “Preface” in H Baharvand (ed), *Trends in Stem Cell Biology and Technology* (New York: Humana Press, Springer, 2009).

² BP Rubin, “Therapeutic Promise in the Discourse of Human Embryonic Stem Cell Research” (2008) 17 *Science as Culture* 13-27, at 13.

³ CB Cohen *Renewing the Stuff of Life: Stem Cell, Ethics, and Public Policy*. (New York: The Oxford University Press, 2007).

⁴ DE Guinn, *Handbook of bioethics and religion*. (New York: The Oxford University Press, 2006).

human welfare. Nevertheless, we need to address the question as to whether human embryos are of such immense moral status that we should never destroy them, even for the sake of conducting research that might help treat, and perhaps save, the lives of human beings. As such, the central thesis of this paper is to explore the moral controversy surrounding human ESC research in the Islamic tradition and to find out how Muslims resolve their ethical debates in this field of biomedicine. This paper will also address the scientific and ethico-religious position of human ESC research in Iran, which has taken the lead in this type of research among Muslim countries since 2003.

2. Human ESC Research in the Context of Islamic Law

Since human ESC research has begun in many countries, its potential to offer new forms of treatment and insights into human development has come up against serious moral and religious questions. One of the key questions is whether human embryos at an early stage of development have the same moral significance as living human beings and thus deserve the same protections. This question has increasingly been confused with the ethical question related to abortion: how should we morally weigh the life of the pregnant woman against the life of her conceptus? This latter question is not relevant in the context of human ESC research, as ESCs are usually harvested from “surplus” IVF embryos that were produced for the purpose of infertility treatment. However, as noted by Gilbert Meilaender: “No doubt it is, in our society, impossible to contemplate this question [whether human embryos at the early stage of development have the same moral significance as living human beings] without feeling sucked back into the abortion debate.”⁵

3. Islam and Clinical Abortion

In Islam, abortion is either absolutely forbidden or to be treated with strong disdain and limited to certain circumstances, including when the mother’s life is in grave danger. Islamic traditions recognise a threat to the mother’s life as grounds for abortion, but they do not give the same consideration to the conditions of the foetus, because until recently it was not possible to know anything about the medical condition of the foetus before birth.

The *Qur’anic* position on embryological development and the creation of humans presents a focal point connected with embryonic sanctity. As Abdulaziz Sachedina notes,⁶ the moral standing of the embryo and foetus remains unresolved in Islamic jurisprudence because of the lack of a precise definition of the beginning of life, which involves religious, ethical, legal and social considerations. There are opposing views about the beginning of life and the time when the ensoulment—the infusion of the soul into the body of the foetus, followed by the conferring of moral status on the foetus—occurs. Different views on the interpretation of the *Qur’anic* verse

⁵ G Meilaender, “Some Protestant Reflections” in S Holland, K Lebacqz and L Cambridge (eds), *The Human Embryonic stem cell debate: science, ethics, and public policy* (MIT Press, 2001), at 142.

⁶ A Sachedina, *Islamic Biomedical Ethics: Principles and Application* (New York: Oxford University Press, 2009).

concerning this point create a division among Muslim jurists as they rule on this and related issues. Determination of the time of ensoulment is based upon an interpretation of the *Qur'anic* scripture:

We created (*khalaqna*) man of an extraction of clay, then We set him, a drop (*nutfah*) in a safe lodging (*i.e. the womb*), then We created of the drop a clot ('*alaqah*), then We created of the clot a tissue (*mudghah*), then We created of the tissue bones ('*azm*), then we covered the bones in flesh (*yaksu lahman*); thereafter We produced it as another creature (*khalaqan akhar*). So blessed be God, the Best of creators (*khaliqin*).⁷

In one *hadith* (Prophet Mohammad's saying) each of the first three stages (lodging *nutfah* in the woman's womb, '*alaqah*, and *mudghah*) is assigned a time period of forty days, which makes for a total of 120 days.⁸ Another *hadith* indicates how on the 42nd night from ejaculation in the uterus, an angel sent by God begins to differentiate the organs of the foetus. The text does not however mention ensoulment.⁹ Other *ahadith*¹⁰ (plural of *hadith*) differ and give 40 days as the total of the four stages.¹¹ Additionally, the *Qur'an* speaks about 'breathing His own spirit' after God forms human beings. This verse informs us about the stage of ensoulment during the intrauterine life:¹²

He Who created all things in the best way and He began the creation of man from clay. Then made his progeny from a quintessence of despised liquid. Then He created him in due proportion, and breathed into him of His spirit. And He gave you (the faculties of) hearing and sight and hearts. Little thanks do ye give!

Reasoning from different *ahadith*, some schools of jurists determined that until the stages were complete, the foetus had no soul, or that God had not breathed His spirit into the foetus, and therefore it had not yet been created. Muslims are, however, encouraged to read and analyse traditional religious sources to find solutions to

⁷ The Qur'an, Al-Mu'minun, 23, 12-14.

⁸ Verily your creation is on this wise. The constituents of one of you are collected for forty days in his mother's womb; it becomes something that clings ('*alaqa*) in the same (period) (*mithla dhalik*), then it becomes a chewed lump of flesh (*mudgha*) in the same (period) (*mithla dhalik*). And the angel is sent to him with instructions concerning four things, so the angel writes down his provision (sustenance), his death, his deeds, and whether he will be wretched or fortunate. Then the soul is breathed into him (see Al-Bukhari, Sahih. 1979. *Al-Sahih, kitab bad' al-Khalq* [vol 4]. Istanbul: Al-Maktaba al-Islami).

⁹ When forty-two nights have passed over the sperm drops, Allah sends an angel to it, who shapes it and makes its ears, eyes, skin, flesh and bones. Then, he says, 'O Lord! Is it a male or female? And your Lord decides what He wishes and the angel records it'. In Ebrahim AFM, Biomedical Issues-Islamic Perspective, Mobeni, Islamic Medical Association of South Africa (IMASA), 1988, 115-116.

¹⁰ For instance, the following *hadith* says: "After the zygote (*nutfa*) has been established in the womb for forty or forty five nights, the angel comes and says: "My Lord, will he be wretched or fortunate?" And both these things would be written. Then the angel says: "My Lord, would he be male or female?" And both these things are written. And his deeds and actions, his death, his livelihood; these are also recorded. Then his document of destiny is rolled and there is no addition to and subtraction from it." (see Al-Bukhari, Sahih. 1979. *Al-Sahih, kitab bad' al-Khalq* [vol 4]. Istanbul: Al-Maktaba al-Islami).

¹¹ S Al-Bukhari, *Al-Sahih, kitab bad' al-Khalq* [vol 4] (Istanbul: Al-Maktaba al-Islami, 1979).

¹² The Qur'an, As-Sajdeh, 32, 7-9.

contemporary problems, which differ from country to country. There is no consensus among Muslim scholars on abortion, and every Muslim country has taken up a regulatory policy.

In fact, nowhere in the tradition is there a definition of an embryo as a living entity right from the zygotic stage. Muslim jurists have mostly regarded implantation of the zygote in the uterus as the determining stage of foetal life at which any infliction of harm to it would require compensation. The rule of abortion is extrapolated from the interpretation of the following verse in the *Qur'an*: "It is He who produced you from one living soul (*nafs wahida*), and then a lodging-place (*mustaqarr*) and then a repository (*mustawda*)."¹³

"A lodging place" is the uterus, whereas "a repository" is the loins in which specific characteristics are preserved for future generations.¹⁴ Hathout¹⁵ notes that, "it [a fertilised ovum] cannot produce a human being unless implanted into the uterus, and so implantation was taken to herald the sanctity of human life." He also argues that the embryo acquires certain rights and that aborting it is unlawful and legally punishable. The punishment is less severe, however, if it is carried out before 120 days, which is the time of ensoulment. Muslim scholars mostly agree that the life exists from the time of the fertilisation of the egg, despite the fact that ensoulment occurs at the 120th day.

Generally, most of the verses quoted against abortion actually deal with the sanctity of life.¹⁶ Although the tradition explicitly mentions the beginning of human creation at the zygotic stage, the verses only cover the stages of gestation from fertilisation to personhood. As noted by Sachedina,¹⁷ "there is total disregard for the inviolability of embryos both in the permissive opinion on abortion and legal permission for the use of spare IVF embryos for research." Any argument to assert foetal inviolability at all stages of its journey towards full human being would have required the jurists to seriously engage the *Qur'an* in deriving an ethical framework to define human personhood in order to affirm the inherent dignity of the pre-ensoulment foetus.

¹³ The *Qur'an*, Al-An'am, 6:98.

¹⁴ Ibn Kathir, *Tafsir* (Beirut, Dar al-Andalus, 1966) Vol. 3:70. He also cites other opinions in which "a lodging" is interpreted as this world and "a repository" as the next after death.

¹⁵ H Hathout, "An Islamic perspective on human genetic and reproductive technologies" (2006) 12 *Eastern Mediterranean Health Journal* S22-28, at S25.

¹⁶ For instance, one of these oft-quoted verses in this section declares: "If anyone slays a human being unless it be [in punishment] for murder or for spreading corruption on earth -- it shall be as if he had slain the whole of humankind" (The *Qur'an* 5:32). Another verse forbids killing of children: "Slay not your children for fear of poverty; We will provide for you and them. Surely the slaying of them is a grievous sin" (the *Qur'an* 17:31). Still another verse forbids the pre-Islamic practice of wa'd – a practice of burying of live female infants for fear of poverty or disgrace: "And when the female infant, buried alive is questioned for what crime was she killed..." (the *Qur'an* 81:8). None of these verses deal with abortion per se; nor do they define or deal directly with the ontological or legal-moral status of the fetus or the religious-legal consequences of expelling it before complete gestation.

¹⁷ A Sachedina, "No Harm, No Harassment: Major Principles of Health Care Ethics in Islam" in DE Guinn (ed), *Handbook of bioethics and religion*, (New York: Oxford University Press, 2006).

4. “Spare” IVF Embryos in Islamic Context

In spite of the unknowns in Islamic law, the benefits of IVF in treating infertility were obvious, as long as such fertilisation was achieved within the legitimate boundaries of marriage. In 1989, the issue of surplus IVF embryos was discussed by a committee of international Muslim religious scholars and physicians of the Islamic Organisation of Medical Science (IOMS). The committee consequently issued a recommendation that explicitly permitted the use of the frozen embryos for research purposes according to Islamic law.¹⁸ One of the main statements for this recommendation was:

According to the opinion of the majority that the destruction of fertilised egg[s] before their nidation in the uterus is allowed, no matter how this destruction is brought about – according to this opinion there is no reason to forbid scientific experiments in accordance with the *Shari’a* (Islamic law). During these experiments the egg cells must not be multiplied. Some disagreed entirely with this view.¹⁹

Following the IOMS recommendation, the Islamic Fiqh Association (IFA, *arabic majma’ al-fiqh al-islami*) organised a similar meeting in 1990. They reviewed several studies about frozen embryos that are almost identical with the studies examined at the IOMS meeting in 1989. Unlike the IOMS, the IFA opposed the scientific use of frozen embryos. In their decree, they emphasised that:

In view of what has become reality concerning the possibility to store non-fertilised oocytes for late use, it is necessary to restrict the number of fertilised eggs to the number necessary for a single treatment, in order to avoid a surplus of fertilised eggs. If for any reason such a surplus of fertilised eggs is brought about, they are supposed to be left without medical help, so that the life of this surplus may end in a natural way.²⁰

This argument is based on the fear of the misuse of embryos, rather than on any theological or philosophical reasoning. It seems that allowing the embryo to die on its own is not considered killing the potential human being. Allowing the embryo to die does also however constitute killing the embryo, but this time by means of not taking any steps to save the potential human being.²¹

It is noteworthy that some Muslim countries prohibit surrogate parenting and the adoption of human embryos on the basis of the importance of determining a child’s true parentage and rights of inheritance.²² Accordingly, donating embryos to other

¹⁸ T Eich, “Decision making processes among contemporary ulama: the example of frozen embryos” (2006) Paper presented in the conference on *Islam and Bioethics: concerns, challenges and responses*. USA. 27-28 March.

¹⁹ Al-Awadi 1995-cited in Eich 2006, at 7.

²⁰ IFA, “Majallat majma’ al-fiqh al-islami” (1990) 3:2151f (cited in Eich 2006).

²¹ S Aksoy, “Making regulations and drawing up legislation in Islamic countries under conditions of uncertainty, with special reference to embryonic stem cell research” (2005) 31 *Journal of Medical Ethics* 399-403.

²² M Inhorn, “Making Muslim babies: IVF and gamete donation in Sunni versus Shi’a Islam” (2006a) 30 *Culture, Medicine and Psychiatry* 427-50.

couples in those countries is out of the question. Moreover, in the *shari'a*, any form of IVF implying procreation outside of the framework of an existing legal marriage would be forbidden. Therefore, the embryo could not be implanted after divorce or if the donor of either the oocyte or the sperm had died. In other words, those embryos would suffer no legal harm by their destruction, because, according to the *shari'a*, they could not have developed legally into a human being anyway.²³ Hence, this would free up “spare” frozen embryos for research²⁴ or discarding. As mentioned earlier, there are issues other than lineage, related to when life begins and “ensoulment” occurs, that affect embryo donation. The moral significance of the early embryo therefore remains at the center of the controversy associated with permission to use it, while its destruction for the purpose of harvesting stem cells is incompatible with the notion of embryonic sanctity and respect for the pre-implantation embryo.²⁵

Despite this controversy, for those Muslim jurists who want to provide moral-legal justification for the use of “spare” embryos as the source of human ESCs for research, juridical solutions are not hard to deduce. Legal principles such as public good (*maslahah*), which promotes what is beneficial, and necessity (*darura*), which overrules prohibition, might provide religious-legal justification and legitimisation.²⁶ In addition, there is an absolute moral obligation (*fard kifayah*) in Islam for physicians and scientists to undertake biomedical research that may result in beneficial treatments for thus far incurable diseases.²⁷ Therefore, as stated by Abdulaziz Sachedina,²⁸ “[i]t is correct to suggest that a majority of the *Sunni* and *Shi'a* jurists will have little problem in endorsing ethically regulated research on stem cells that promises potential therapeutic value.”

5. The Development and Regulation of Human ESC Research in Iran

In 2002, Iran's supreme leader, Ayatollah Khomeini, publicly supported human embryo research and congratulated the scientists who work on SCs. Iran's clerics and political leaders have also actively promoted science and technology in an attempt to enhance the country's global status.²⁹ Due to the positive decrees (religious opinion about whether or not an action is permissible) on the use of human embryos for SC research and therapeutic goals, Iran is one of the first Muslim countries to produce

²³ GI Serour, “Religious perspectives of ethical issues in ART: 1. Islamic perspectives of ethical issues in ART” (2005) 10 *Middle East Fertility Society Journal* 185–190.

²⁴ M Weckerly, “The Islamic View on Stem Cell Research” (2002) available at http://org.law.rutgers.edu/publications/law-religion/new_devs/RJLR_ND_56.pdf (accessed 24 Aug 09).

²⁵ See A Sachedina, see note 17 above.

²⁶ See A Sachedina, see note 6 above.

²⁷ M Siddiqi, “An Islamic Perspective on Stem Cells Research” (2002) available at www.IslamiCity.com (accessed 29 Aug 09).

²⁸ A Sachedina, “Islamic perspectives on research with human embryonic stem cells” in *Ethical issues in human stem cell research Religious perspectives [vol. 3]*. Rockville, MD: Government Printing Office (National Bioethics Advisory Commission), at G3.

²⁹ M Saniei and R De Vries “Embryonic stem cell research in Iran: status and ethics” (2008) 5 *Indian Journal of Medical Ethics* 181-4.

human ESCs.³⁰ Following this approval, the Royan Institute, one of the leading institutes for SC research in Iran, has expanded its work on investigating the potential for human ESCs to differentiate into various cell types,³¹ including cardiomyocytes, beta cells and neural cells.³² Other research institutes have been involved in regenerative medicine. These include the Iranian Molecular Medicine Network (with 34 research institutes and centers joined as members), the Iran Polymer and Petrochemical Institute and Shaheed Beheshti University of Medical sciences.³³ The main goal of this research is to understand the human cell specialisation and developmental biology as well as to create specialised cells to treat a wide range of diseases and conditions.³⁴

The rapid progress in SC science led the Iranian government to put in place an appropriate ethical and scientific supervision of this field of science and its therapeutic applications. The aim was to promote responsible, fair and humane research. The compilation of the specific National Ethical Guidelines for Biomedical Research (including ethical guidelines for genetic research, gamete and embryo research, organ and tissue transplantation research, clinical trials, research on minors, and research on animals) was developed as an important effort in Iran in recent years.³⁵ As Larijani and Zahedi³⁶ state, “the main rules of activities consist of the holy *Qur’an* and principles of Islamic ethics; the religious opinion (*fatwa*) of Islamic scholars on special issues; the national laws or ethics codes; international guidelines; and the norms of the society.” It is noteworthy that Ethical Guidelines for Research on Gametes and Embryos, drafted in 2005, is one of the topics in which the use of human embryos for SC research and therapy are addressed along with the general guidelines.^{37,38} These codes are in accordance with the international declarations, such as:

- Use of only surplus IVF embryos, below 14 days, for research including destruction of the embryo;
- Prohibition of the production of human embryos for research purposes;

³⁰ B Larijani, F Zahedi and H malek Afzali, “Medical ethics in the Islamic Republic of Iran” (2005) 11 *Eastern Mediterranean Health Journal* 1061-72.

³¹ See M Saniei and R De Vries, see note 29 above.

³² H Baharvand et al, “Establishment and in vitro differentiation of a new embryonic stem cell line from human blastocyst” (2004) 72 *Differentiation* 224-9.

³³ G Kinkead, “Stem cell transplants offer new hope in some cases of blindness” (2003) available at <http://query.nytimes.com/gst/fullpage.html?res=9907E7DE103BF936A25757C0A9659C8B63> (accessed 19 Aug 09).

³⁴ H Baharvand et al, “Generation of new human embryonic stem cell lines with diploid and triploid karyotypes” (2006) 48 *Development, Growth & Differentiation* 117-28.

³⁵ B Larijani and F Zahedi, “Biotechnology, Bioethics and National Ethical Guidelines in Biomedical Research in Iran” (2007a) 9 *Asian Biotechnology and Development Review* 43-56.

³⁶ B Larijani and F Zahedi, “National bioethical legislation and guidelines for biomedical research in the Islamic Republic of Iran” (2008) 86 *Bulletin of the World Health Organization* 630–634, at 630.

³⁷ K Aramesh and S Dabbagh, “An Islamic view to stem cell research and cloning: Iran’s experience” (2007) 7 *Amerian Journal of Bioethics* 62-3.

³⁸ See B Larijani and F Zahedi, see note 36 above.

- Prohibition of the production of hybrids using humans and animals;
- Prohibition of eugenics;
- Responsible persons for the embryo are the donor, her partner and its recipients.

However, Iran's approach is currently based on ethical guidelines rather than any parliamentary legislation.³⁹

Iran, under Islamic Law, takes a liberal approach to stem cell technology, allowing scientists to use spare IVF and affected PGD embryos for SC research. Many Muslim countries, by contrast, voted for a ban on all forms of human ESC research in the context of the 2005 UN General Assembly meeting regarding the *United Nations Declaration on Human Cloning*.⁴⁰ With respect to the adoption of technology, Iran presents an interesting example. As noted by Soraya Tremayne,

[W]hile the *Sunni* follow the *Qur'anic* tradition closely, the *Shi'a*, especially the Iranian *Shi'a*, try to accommodate innovations. *Ijtihad* (the interpretation of one or a few Islamic scholars of a particular age for the legal ruling applicable to the situation) allows adjustments to accommodate change within Islamic beliefs, and *fatwas* (rulings) follow from such interpretations.⁴¹

Therefore the rules, regulations and practice in Iran are based mainly on *fatwas*, which are not the result of public and secular debate.⁴² Once approved by clergy, new technologies do not seem to require extensive moral and legal deliberations by other bodies, such as ethics committees.⁴³ Without providing political and strategic analysis, we present a few examples of Iran's adaptation of technology and modern medicine.

One of the most challenging issues in this respect has been that of changing parameters for abortion in Iran. On 21 June 2005, the parliament of Iran ratified the *Therapeutic Abortion Act* which permits abortion during the first four months of pregnancy in the event that the life of the woman is in danger or if the fetus is malformed. Prior to the parliamentary vote on the bill, top lawmakers secured the support of Islamic religious leaders in Qom, an important step aimed at deflating the controversy potentially raised by the measure in the highly religious society. A few clerics among the lawmakers opposed the bill nevertheless.^{44,45} Although scholars have considered the effect of severe fetal deformities on the mother, families and

³⁹ See K Aramesh and S Dabbagh, see note 37 above.

⁴⁰ M Abdur Rab and MH Khayat, "Human cloning: Eastern Mediterranean Region perspective" (2006) 12 *Eastern Mediterranean Health Journal* S29-37.

⁴¹ S Tremayne, "Not All Muslims Are Luddites" (2006a) 22 *Anthropology Today* 1-2, at 1.

⁴² See K Aramesh and S Dabbagh, see note 37 above.

⁴³ See S Tremayne, see note 41 above.

⁴⁴ KM Hedayat, P shooshtarizadeh and M Reza, "Therapeutic abortion in Islam: contemporary views of Muslim Shiite scholars and effect of recent Iranian legislation" (2006) 32 *Journal of Medical Ethics* 652-7.

⁴⁵ B Larijani and F Zahedi, "Changing parameters for abortion in Iran" (2006) 1 *Indian Journal of Medical Ethics* 131-32.

society, the legislation does not permit abortion for pregnancies that are unwanted or for other social and economic reasons.

Other complex and controversial examples are sperm, egg and embryo donation in the new assisted reproductive technologies (ARTs). Both *Sunni* and *Shi'a* schools agree that the use of ARTs should be limited to the marital union. While the *Sunni* maintain that no third party donation of sperm or egg is permissible, the *Shi'a*, in the event of infertility of either the wife or husband, have resorted to the unique practice of temporary marriage⁴⁶ in order to legitimise the third party donation.⁴⁷ In 2003, however, the *Act of Embryo Donation to Infertile Spouses* was passed, paving the way for third party reproduction in Iran.⁴⁸ Despite the new law, not all infertile couples in Iran are using the now generally available ART technologies, primarily because they create a new form of kinship, which has biological, medical, legal, religious, ethical and moral aspects.⁴⁹ These couples' decisions regarding the use of technologies are influenced by their own perceptions and expectations, as well as those of society.⁵⁰

6. Conclusion

Individual countries have taken up the different policies on the use of the embryo for stem cell research based on their socio-cultural, political, and even economic backgrounds. As Isasi and Knoppers⁵¹ note, "the historical, cultural and sociological context, the institutional framework, and the mobilisation of stakeholders are factors that help explain why countries that seemingly share similar socio-religious beliefs [and perhaps scientific interest] have adopted diametrically opposite public policies." Iran, as an Islamic country, is influenced by a culturally-based Islamic faith. It has resorted to extensive use of the mechanisms available to Islam, such as *ijtihad*, to legitimise certain matters, including embryo donation to research purposes. These have been justified through interpretations and independent reasoning, something which the *Sunni* do not use as much as the *Shi'a*.

Countries with similar religious backgrounds and scientific interests may therefore take up new knowledge in different ways, as a result of the influence of additional factors. For Iran, the introduction of an Islamic system has forced religious scholars into an unprecedented role of responsibility and involvement in social planning and

⁴⁶ Temporary marriage involves a man and woman agreeing to get married for a limited length of time, from one hour to 99 years (see Haeri, S. 1989. *Law of desire: Temporary marriage in Iran*. London: I.B. Tauris).

⁴⁷ See S Tremayne, see note 41 above.

⁴⁸ B Larijani and F Zahedi, "Ethical and Religious Aspects of Gamete and Embryo Donation and Legislation in Iran" (2007b) 46 *Journal of Religion and Health* 29-33.

⁴⁹ S Tremayne, "Whither Kinship? New Assisted Reproduction Technology Practices, Authoritative Knowledge and Relatedness—case studies from Iran" in *Essays on gamete and embryo donation in infertility treatment: From medical, theological, legal, ethical, psychological and sociological approaches* (Tehran: Avesina Research Center & SAMT Publications, 2006b).

⁵⁰ MJ Abbasi-Shavazi et al., "The 'Iranian Art Revolution': Infertility, Assisted Reproductive Technology, and Third-Party Donation in the Islamic Republic of Iran" (2008) 4 *Journal of Middle East Women's Studies* 1-28.

⁵¹ RM Isasi and BM Knoppers, "Mind the gap: policy approaches to embryonic stem cell and cloning research in 50 countries" (2006) 13 *European Journal of Health Law* 9-25, at 9.

public health. Further, technological innovation and scientific achievement holds the hope of a “golden age” for the intellectual and material benefit of the people of Iran, an assertion used rhetorically by the supreme leader of Iran, the Ayatollah Khomeini, to justify the position of Iran in the Muslim world. Ambiguity still, however, surrounds this debate. Are these the things that distinguish *Shi'a* Iran from the *Sunni* world? Are they the reason that Iran has the most permissive human ESC research policy among Muslim countries? Answers to these questions will require extensive research into the practices of Muslim countries, in order to identify the practical factors involved in the making of human ESC science policy.

Acknowledgements

The author warmly thanks Professor Clare Williams, Director, and James Porter, Research Fellow, at the Centre for Biomedicine and Society, King's College London for their insightful and constructive comments. She also acknowledges the collaboration established with Dr Hossein Baharvand, Head of Department of Stem Cell Biology and Technology, Royan Institute, Tehran whose work is referred to in this article. The work upon which this piece is based is funded by a Wellcome Trust Biomedical Ethics Developing Countries Studentship (grant no:086072).