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ISLAMIC LAW PERSPECTIVE ON THE UTILISATION OF HUMAN EMBRYONIC STEM CELLS

By

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Abstract

Human embryonic stem cells are used for the treatment of conditions such as infertility, spinal cord injuries, genetic disorders, neurological and haematological diseases and are suggested as means of curbing graft rejection. Although new findings indicate that the body may reject transplanted human embryonic cells. The significance of human embryonic stem cells lies in their ability to proliferate and differentiate into different cells. Despite their prospective benefits, their utilisation raises issues from the perspectives of medicine, ethics, law and Islam. From the perspective of Islam, the two central issues that must be addressed in the context of using human embryonic stem cells are consent and abortion. This paper adopts a doctrinal research and discusses the Islamic law perspective on the utilisation of human embryonic stem cells. It is found out that willful termination of embryos for the sole purpose of obtaining cells is an act of aggression in Islam.

Keywords: **Human, Embryonic, Stem Cells, Islamic Law, Utilisation and Haematological**

1.0 INTRODUCTION

Islam is a complete way of life, which provides guidance to Muslims on all matters. Through the primary and secondary sources of the *Shari'ah,* Muslims have a basis for knowing the legal implications of all their actions and utterances i.e. whether it is permissible, obligatory, recommended, detestable or forbidden. However, contemporary issues such as the use of human embryonic stem cells have no clear cut provisions in the *Qur'an* and the *Sunnah*, which are the primary sources of the *Shari'ah.* In Islam, knowledge ought to precede actions. Thus, by resorting to *Ijtihad* (a process of determining issues through using the sources), Muslims have a direction on the permissibility or otherwise of contemporary issues including the use of human embryonic stem cells. This is with a view to avoiding transgressing the limit set by the Lawgiver.

The utilisation of human embryonic stem cells are proposed in three areas namely transplantation to treat injuries and diseases, development of vaccine and basic biology research,[1] they however, give rise to medical, ethical, legal and religious issues as it involves the termination of pregnancy. This paper discusses the Islamic law perspective on the utilisation of human embryonic stem cells.

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[1] Charlotte Lozier Institute. *History of Fetal Tissue Research and Transplants.* Retrieved January, 2019, from https://www.lozierinstitute.org

2.0 CONCEPTS

2.1 What are Stem Cells?

Stem cells are unspecialised cells (blank cells), which are found in all humans, from the early stages of human development to the end of life and are fundamental to the growth, development, maintenance and repair of other organs, brain, skin, muscles, bones, nerves and blood.[2] The Islamic *Fiqh* Academy in its seventeenth session, held in Makkah, defines stem cells as follows:

> …the cells of origin from which a fetus is created, have the potential, by God's will, to form all kinds of body cells. Scientists have recently been able to identify, isolate, and cultivate these cells, for therapeutic purposes and various scientific experimentation. These cells can be used to treat some diseases. They are expected to have in the future a great impact in treating many diseases and congenital deformities, including some types of cancer, diabetic urine, kidney and liver failure, and others.[3]

The uniqueness of stem cells is their ability to proliferate and renew themselves for long periods. [4] They can grow into cells that serve various functions in different parts of the body thus providing the possibility of bridging the gap between organ demand and supply through stem cell transplantation and for the treatment of life limiting conditions. Regenerating a patient's damaged cells and incorporating them in the same person is a better alternative to organ donation, as favourable outcomes are obtained where the recipient's stem cells are used for regrowing his organs. This is in contradistinction with transplantation from unidentical members of the same specie or of different species, where the recipient will be placed on immunosuppressants (anti-rejection) drugs.

2.2 Why Stem Cells?

There is an immense potential in the use of stem cells. This is in the context of generating cells and tissues that could be used for cell-based therapies for devastating and currently incurable disorders, such as blindness,[5] neurological diseases, haematological diseases, diabetes, genetic disorders and spinal cord injuries.[6] This is due to the fact that they are pluripotent (they have the ability to become any cell in the body).[7] However, this depends on the stage in which the cells are

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[2] Kalra, K., and Tomar, P.C. (2014). Stem Cell: Basics, Classification and Applications. *AJPCT, 2*(7):919-930. Retrieved February 3, 2019, from https://www.imedpub.com

[3] *Transplanting and Implanting Cells of the Brain and Nervous System.* Retrieved February 11, 2019, from http://www.islamset.net p.45-46

[4] Stem Cells Portal. *What Are The Unique Properties Of All Stem Cells?* Retrieved March 13, 2020, from https://www.stemcellsportal.com/content/what-are-unique-properties-all-stem-cells

[5] Ye, J., Bates, N., Soteriou, D. *et al.* (2017). High Quality Clinical Grade Human Embryonic Stem Cell Lines Derived from Fresh Discarded Embryos. *Stem Cell Res Ther* 8:128. https://doi.org/10.1186/s13287-017-0561-y

[6]Romano, G. (2004). Stem Cell Transplantation Therapy: Controversy over Ethical Issues and Clinical Relevance. *Drug News Perspect, 17*(10): 637. Retrieved January 7, 2019, from https://www.journals.prous.com

[7] Ishii, T., and Eto, K. (2014). Fetal Stem Cell Transplantation: Past, Present, and Future. *World J Stem Cells, 6*(4):404-420. Retrieved February 3, 2019, from https://www.ncbi.nlm.nih.gov

extracted i.e. when they are gotten from blastocysts (a ball of around 100 cells each of which has the capacity to develop into any of the 200 cell types that comprise the human body).[8]
Also stem cells could become any organ in the body when implanted into a blastocyst,[9] which is another means of bridging the gap between organ demand and supply, although the problem of organ rejection still remains except for monovular twins or where the cells are retrieved from the same person and used for him. Hence the advantage of incorporating stem cells into the person(s) from whom they are obtained is that the incidence of rejection is eliminated.
Human embryonic stem cells are the preferred source of stem cells and are obtained via induced (elective) abortion or natural (spontaneous) abortion and involves the culturing of foetal cells in laboratory dishes in such a way that they continue to multiply and grow to be used for purposes such as having more cell lines, or to test a drug's ability to damage genetic material, or for transplantations.[10] This raises moral, legal ethical and religious issues because the extraction is not for its benefit and brings an end to its existence. According to Mason and Laurie, "the use of an embryo for any purpose that does not bear upon its future good constitutes a wrong; the embryo is, otherwise being treated as a means to an end rather than an end in itself - a process which offends a fundamental principle governing the way in which we treat other persons".[11]

3.0 SOURCES OF STEM CELLS

Stem cells are obtained from sources such as embryos, the placenta, the umblical cord, children, adults, aborted foetuses, surplus zygotes, blood, bone marrow,[12] and aborted foetal germ cells.[13] However, human embryonic stem cells are preferable to adult stem cells although the use of the former continues to raise unresolved medical, ethical, legal and religious issues.
Adult stem cells are easier to maintain in culture and its use does not generate much controversy, but they pose a problem where a large amount of cells are needed because they lose their pluripotency after a defined number of passages in culture.[14] They are not immortal like stem cells that are derived from blastocysts, which can multiply indeterminately and differentiate naturally into various types of tissues.[15] Instead they are multipotent (they can only develop into particular kinds of cells). Also very small amount of stem cells that are obtained from the bone marrow and blood of adults.[16]

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[8] Mason, J.K. and Laurie, G.T. (2006). Mason and McCall Smith's Law and Medical Ethics. Oxford University Press, New York, p.661

[9]Cascalho, M. and Platt, J.L. (2006). The Future of Organ Replacement – Needs, Potential Applications and Obstacles to Application. *Transplant Proc. 38*(2):362-364.Retrieved April 11, 2020, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1475508/

[10] Institute of Medicine (US) Conference Committee on fetal Research and Applications. (1994). *Setting the Stage: Fetal Research, Fetal Tissue Research, and Historical Timeline of Regulation and Legislation.* Retrieved January 1, 2019, from https://www.ncbi.nlm.nih.gov

[11]Mason, J.K. and Laurie, G.T. (2006), Op. Cit., p.659

[12] Islam Question & Answer. *Stem Cells: Definition, Ruling on Setting Up Stem Cell Banks and Using them for Medical Purposes.* Retrieved June 2, 2019, from https://www.islamqa.info

[13]Mason, J.K. and Laurie, G.T. (2006), Op. Cit., p.661

[14] Atala et al. *United States Patent Application Publication.* Retrieved April 14, 2020, from https://patentimages.storage.googleapis.com/5d/e5/f0/d44eb5d256c2ea/US8021876.pdf

[15] Atala et al. Op. Cit.

[16] Lo, B. and Parham, L. (2009). Ethical Issues in Stem Cell Research. *Endocr Rev., 30*(3): 204-213. Retrieved January 7, 2019, from https://www.ncbi.nlm.nih.gov

Human embryonic stem cells on the other hand can differentiate into any type of cell in the body, from heart cells to brain cells to muscle cells[17] but this can only be retrieved from embryos, which indicates terminating their 'lives' thereby denying them the right to exist.

4.0 THE USE OF HUMAN EMBRYOS

The word embryo is used in relation to the development of a baby inside the womb (based on its gestational age). In Arabic, *Janin* is the word for both embryo and foetus, which means hidden or covered in darkness[18] while medically an embryo differs from a foetus. An embryo refers to the early stage of development of an unborn child, representing gestation between initial implantation as a blastocyst and the end of the second month of pregnancy while the embryo is known as a foetus after this period.[19] Thus an embryo signifies the early stage of human development approximately equivalent to the 5^{th}-10^{th} weeks of pregnancy whereas a foetus begins to develop at the end of the 10^{th} week of pregnancy (in the 11^{th} week of pregnancy) while others say at the 8^{th} week of pregnancy.[20]

As a result of advancement in the field of medicine, researchers and doctors are utilising embryos for purposes such as the development of vaccine, treating diseases, conducting research, organ transplantation and assisting reproduction for persons with infertility problems or those who do not want to carry their babies in their wombs. These embryos are procured in different ways, to be used for the aforementioned purposes and may be terminated intentionally, accidently or naturally for the purpose of retrieving their stem cells, and neural tissues for the benefit of others. Stem cells may be obtained from the uterus *(in vivo)*, outside the uterus, or *in vitro*, a procedure of fertilising an ovum and sperm in an external device, to assist primarily women with infertility or genetic problems.

5.0 THE STATUS OF THE EMBRYO IN ISLAM

All Muslim jurists are unanimous that the unborn child is human and that the *Qur'anic* verse *"…And if anyone saved a life, it would be as if he saved the life of all mankind"*[21] applies to the unborn child. They are however divided on the legal status of the *Janin*: some regard the *Janin* as a 'person' since it is a human creation while others consider it as a 'non-person' because it is living within its mother and from her,[22] which means it does not have an independent existence from her. Abu Hamid Al-Ghazali states that the foetus has two distinct stages: the first being that of 'potential life', which the mother does not feel while 'apparent life', is felt by the mother at the second stage. Notwithstanding the distinction between potential and apparent life, Al-Ghazali mentions the start of human life as follows:

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[17] Ahuja, C.S., Khazaei, M., Chan, P., O'Higgins, M. and Fehlings, M.G. *Making Neurons from Human Stem Cells.* Retrieved January 10, 2019, from https://www.kids.frontiersin.org

[18] Yacoub, A.A. (2001). *The Fiqh of Medicine: Responses in Islamic Jurisprudence to Developments in Medical Science.* Ta-Ha Publishers Ltd., London, p.221

[19] Harrap's Dictionary of Medicine & Health. (1990). Harrap Books Ltd, Kent, United Kingdom, p.137

[20] Stoppler, M.C. *Embryo vs Fetus: Differences between Stages Week by Week.* Retrieved January 8, 2019, from https://www.medicine.net.com

[21] Muhammad Muhsin Khan and Muhammad Taqi-ud-Din Al-Hilali (1996). *Interpretations of the Meanings of The Noble Qur'aan in the English Language.* Dar-Us-Salam Publishers and Distributors, Riyadh, Saudi Arabia, p.156

[22] Yacoub, A.A. Op. Cit. p.221

> When the female egg is fertilized by the sperm, and then attaches itself to the uterus. To destroy such a fertilized egg is an offence, which becomes far more serious after the soul is breathed into it. But it culminates into a heinous crime after a live birth. This was practiced by some Arabs who buried their daughters alive in pre-Islamic days.[23]

Thus the penalties for unlawfully separating the *Janin* from its mother depends on the stage of its development, which is as follows: *Sulalah min tin* (origins from water and earth); *Nutfa* (sperm); *Al-Amshaj* (which becomes mixed up with elements from the female); *'Alaqa* (something that clings); *Mudghah, mukhallaqa wa ghaira mukhallaqa* (something that resembles a chewed up lump, differentiated and undifferentiated; bones appear, then becomes coated with flesh and then it becomes *Khalqan akhar* (another creation).[24]

Dr. Hassan Hathut describes the process of fertilisation as follows:

> The sperm and the egg are like the two parts of scissors. Neither can cut on its own. Only when the two parts combine to form a pair of scissors can they start to cut. The union of the sperm and the egg marks the beginning of human life. The cell will geometrically multiply to produce 2, 4, 8, 16, 32, 64, 128, etc. Gradually, different types of cell will develop; some are big, others are medium or small. In two months time, a small human being starts to develop and to grow.[25]

The Messenger of Allah (S.A.W.) narrated the creation of human beings: "The creation of any one of you is gathered in the womb of his mother for forty days as a *Nutfa* (drop), then later an *'Alaqa* (blood clot) for the like of that, then later a *Mudgha* (morsel of flesh) for the like of that. Then the angel is sent to him and breathes the *Ruh* into him."[26] Some jurists are of the view that abortion before the fortieth day of conception, especially when there is justification is lawful. These jurists include Ibn al-Humam al-Hanafi, and Al-Mardawi.[27]

On the status of an embryo, the seminar on Islamic Organisation for Medical Sciences[28] resolves that an embryo is a living organism from the time of conception. Also, the recommendations of the seminar of 1985, which dealt with the subject of Human Life are as follows:

> From the moment a zygote settles inside a woman's body, it deserves a unanimously-recognized degree of respect, and a number of legal stipulations apply to it.

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[23] Al-Khayat, M.H. *Health as a Human Right in Islam.* Retrieved February 22, 2019, from https://www.applications.emro.who.int

[24] Ibid

[25] Abu Zaid, B.A. (2002). Fiqh of Current Controversial Issues, Vol. 1, Aljumuah Magazine for Editing & Publishing, p.155

[26] Ahadith.co.uk, *An-Nawawi's 40 Hadith.* Retrieved April 6, 2020, from https://ahadith.co.uk/hadithwithcommentary.php?id=444

[27] Islam Question & Answer. *Aborting the Foetus before Forty Days because of One's Psychological and Social Situation.* Retrieved May 28, 2019, from https://www.islamqa.info

[28] International Conference on Islamic Code of Medical Ethics based on the Islamic Organisation for Medical Sciences (IOMS)

> When it arrives at the spirit-breathing stage, the time of which is subject to controversy, being forty or 120 days, the fetus acquires greater sanctity, as *fuqahah* (jurists) agree, and additional legal stipulations apply to it.

It can be deduced from the above that right from the onset of the mixing of the sperm with the ovum, a zygote acquires inviolability, which should not be tampered with unless there is a legal justification such as the abortion occurring, as a result of chromosomal abnormality, by accident or induced deliberately to save the life of the mother.

6.0 RETRIEVAL OF HUMAN EMBRYONIC STEM CELLS

Most human embryonic stem cells are gotten from embryos at the blastula stage (the stage immediately after fertilisation when a hollow ball of cells is formed as a result of series of cell division. This is when the embryo is 3-5 days old,[29] or 5 days to two weeks,[30] which have been fertilised *in vitro* (taking place elsewhere outside a living organism; in an external device) *or in vivo* (taking place in a living organism). However, the most accurate period for retrieving cells is when the embryo is 5-7 days and the extraction of the stem cells from the blastocyst marks the end of the blastocyst thereby signifying the end of the pregnancy.

It is pertinent to mention that the Qur'an and the *Sunnah* are silent on the utilisation of human embryonic stem cells being a recent innovation. However, Allah (Exalted be He) commands Muslims to refer issues to the repositories of knowledge. Thus questions are referred to the *Fuqaha* (jurists) to make pronouncements in the light of the primary and secondary sources of Islamic Law. Today, contemporary issues are being referred to bodies such as the Islamic *Fiqh* Academies in Saudi Arabia and India and also to *Fiqh* Councils as well as jurists in their individual capacities to make pronouncements.

Regarding the use of stem cells from surplus zygotes, Muslim jurists are divided on the status of the surplus zygotes: the majority view is that they enjoy no legal status before they are implanted onto the uterus membrane. According to the Islamic Organisation of Medical Science:

> The opinion of the majority (with which some disagreed) is that the destruction of the fertilised egg before their *nidation* [implantation] in the uterus is allowed, no matter how this destruction is brought about. So according to this opinion there is no reason to forbid scientific experiments in accordance with the *shari'a*. During these experiments, the egg cells must not be multiplied. Some disagreed entirely with this view.[31]

This implies that there is no prohibition on destroying fertilised eggs provided it is prior to implantation and scientific experiments may be carried out only in accordance with the *Shari'ah*.

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[29] National Institutes of Health. *Stem Cell Information.* Retrieved February 2, 2019, from https://www.stemcells.nih.gov

[30] Islam Question & Answer. *Stem Cells: Defintion, Ruling on Setting Up Stem Cell Banks and Using them for Medical Purposes.* Retrieved February 4, 2019, from https://www.islamq&a.info

[31] Saniei M, Baharvand H (2018) Human Embryonic Stem Cell Science in Muslim Context: "Ethics of Human Dignity" and "Ethics of Healing, *Adv Med Ethics* 4:1. doi: 10.12715/ame.2018.4.3

While the minority holds the view that it is considered as the first stage in the creation of human being.

The Council of the Islamic *Fiqh* Academy[32] discussed the subject of "Transplanting and Implanting Stem Cells" and held that it is lawful to cultivate stem cells for treatment or to carry out permissible research provided the sources are legitimate. In the case of children, they must not be exposed to any risk and permission must have been obtained from their guardians. In the case of adults, their consent must have been sought and obtained and the procedure must be risk-free. It is imperative to mention that this ruling does not address the use of embryonic stem cells and neither does it legitimise the donation use of surplus zygotes because of the preservation of lineage, which is one of the ultimate objectives of the *Shari'ah.*

Informed consent is central to the extraction, preservation and use of stem cells. This is particularly in relation to embryonic cell research.[33] Thus it is wrong for doctors to extract or retain stem cells without parental permission. Parents could only give their permission to have stem cells from their aborted embryos or foetuses obtained provided the abortion occurred spontaneously or as a result of a therapeutic reason allowed by Islam. It is however unlawful to destroy embryos for the purpose of cultivating their cells. This is a view also built on secular doctrine: "the human embryo, even in the earliest stages of development, is a potential person and part of the continuum of human existence. Since all humans have inherent and inalienable rights, it is argued that the sacrifice of even pre-implantation embryos in order to harvest stem cells represents an example of ethics running amok".[34]

Neural stem cells are multipotent and can be generated from foetuses, embryos, and embryonic stem cells or induced pluripotent stem cells and are crucial for the treatment of degenerative diseases of nervous system.[35] This has become possible because of the uniqueness of foetal cells in actively multiplying:

> Normal adult nerve cells cannot replicate whereas foetal cells are actively growing and multiplying; theoretically, therefore, an implanted foetal cell will grow and provide a source of important cellular metabolites that are often deficient in the aged…foetal brain cells must be immature and are ideally harvested at 10-14 weeks' gestation. Thus… excluding some very rare opportunities derived from natural spontaneous miscarriage, the process is inextricably linked with abortion…the individual brain cells must be viable in themselves; can it then be said that the foetus is dead when subjected to surgery? Here, we must rely to an extent on semantic and pragmatic arguments. A 10-14 week-old foetus is not viable – it has no organized heart beat, its lungs cannot conceivably function as oxygenators…

[32] Retrieved February 23, 2019, from http://www.islamset.net pp. 46-47

[33] Caulfield, Timothy, Ogbogu, Ubaka, & Isasi, Rosario M. (2007). Informed Consent in Embryonic Stem Cell Research: Are We Following Basic Principles?(Commentary). *CMAJ: Canadian Medical Association Journal, 176*(12), 1722-5. Retrieved April 14, 2020, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1877848/

[34] Samanta, J and Samanta, A. (2015). Medical Law. Second Edition. Palgrave, United Kingdom, p.438

[35] Yin, X., Li, L., Zhang, X., Yang, Y., Chai, Y., Han, X., and Feng, Z. (2013). Development of Neural Stem Cells at Different Sites of Fetus Brain of Different Gestational Age. *Int J Clin Exp Pathol, 6*(12):2757-2764. Retrieved February 10, 2019, from https://www.ncbi.nlm.nih.gov

> But,…it is still very difficult to answer the question: 'Is it brain dead?' in the affirmative.[36]

The placenta is another source of stem cells. The placenta attaches the developing foetus to the uterine wall, allows a movement of gases, nutrients and hormones between the mother and the foetus and without which an embryo cannot survive.[37] As a result of the placenta's role in the transportation of blood and oxygen, it is rich in blood vessels function, which can be collected and stored for future therapeutic use.[38]. Placentas may be buried, discarded as medical waste or stem cells may be obtained from them to be used immediately for the treatment of some diseases or banked for future use. Thus placental stem cells are derived from placental tissue or blood and retrieved after delivery but permission must be sought from parents if stem cells are to be cultivated.

Although the placenta is being considered as an alternative to embryonic and adult stem cells because the utilisation of stem cells from embryos raises ethical, moral, religious and legal issues, foetal tissue could be obtained from placentas during gestation and at term.[39] Ethical issues may arise especially where a pregnancy is terminated intentionally for the purpose of harvesting placental stem cells or where they are extracted as a result of duress, undue influence, coercion, misrepresentation or in violation of the owner's directive against extraction.

The umblical cord connects the foetus to the placenta and is the most important source of stem cells and it may contain as many as 200 million stem cells.[40] However, because of the immense benefits of stem cells taken from the umblical cord, some doctors deliberately abort pregnancies to obtain umblical cords. There is a difference between making use of stem cells found in the umblical cord especially when it is discarded from cases where a mother specifically objects to such practice. The latter is considered *Haram.* In both the first and second seminars of the IOMS in 1983 and 1985 (on Reproduction and on Human Life: Its Inception and End), agreement was reached that an embryo is entitled to respect and has sanctity from the moment of insemination, and that this sanctity increases at the time of spirit breathing. Thus it is not permissible to deliberately induce abortion for the purpose of using the cells, tissues and organs of embryos or foetuses.

7.0 CONCLUSION

Regardless of the immense benefits of the use of human embryonic stem cells in treating conditions such as infertility, neurological diseases, haematological diseases, diabetes, and spinal cord injuries, it raises a lot of issues from ethical, religious, medical, and legal perspectives. This is particularly in relation to the willful termination of human embryos for the purpose of using their stem cells. The embryo must be respected in all its stages of development because it acquires

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[36] Mason, J.K. and McCall Smith, R. A. (1994). *Law and Medical Ethics.* (4th ed.) Butterworths, London.

[37] Pipino, C., Shangaris, P., Resca, E., Zia, S., Deprest, J., Sebire, V.J., David, A.L., Guillot, P.V., and Coppi, P.D. (2013). Placenta as a Reservoir of Stem Cells: An Underutilized Resource? *British Medical Bulletin, 105*(1):43-68. Retrieved February 11, 2019, from https://www.academic.oup.com

[38] Hildreth, C. *What are Placental Stem Cells? What are Placental Stem Cells Used For?* Retrieved February 11, 2019, from https://www.bioinformant.com

[39] Pipino, C. et al, Op. Cit.

[40] Islamic Question & Answer. *Stem Cells: Definition, Ruling on Setting Up Stem Cell Banks and Using them for Medical Purposes.* Retrieved January 8, 2019, from https://www.islamqa.info

inviolability from the onset of fertilisation. Thus aborting human embryos for the exclusive purpose of obtaining cells is an act of aggression, which all must strive to prevent.