JFatwa ISSN: 2232-1047 eISSN: 0127-8886
Journal of Fatwa Management and Research
مجلة إدارة وبحوث الفتاوى | Jurnal Pengurusan dan Penyelidikan Fatwa
SEPT 2023 | VOL. 28 | NO. 3
ISSN: 2232-1047 eISSN: 0127-8886
www.jfatwa.usim.edu.my

HUMAN STEM CELL TRANSPLANTATION: AN OVERVIEW OF THE ISLAMIC PERSPECTIVE'S ETHICAL ISSUES IN MALAYSIA

Muhamad Rafiqi Hehsan[1a]*, 'Imran Mohd Pazudin[2b], Muhammad 'Afif Rosdin[3c], Wan Athirah Wan Izudin[4d], An Nisa Yustisia R[5e], Nisya Oktia Nahdah[6f] and Zulkifli Dahalan[7g]

[a]Faculty of Medicine & Health Sciences, Universiti Sains Islam Malaysia (USIM), Persiaran Ilmu, Putra Nilai, 71800 Nilai, Negeri Sembilan, MALAYSIA.
E-mail: muhamad_rafiqi@usim.edu.my[1]
[b]Faculty of Medicine & Health Sciences, Universiti Sains Islam Malaysia (USIM),
E-mail: imranpazudin@gmail.com[2]
[c]Faculty of Medicine & Health Sciences, Universiti Sains Islam Malaysia (USIM),
E-mail: muhdafifrosdin@gmail.com[3]
[d]Faculty of Medicine & Health Sciences, Universiti Sains Islam Malaysia (USIM),
E-mail: wanathirahizudin29@gmail.com[4]
[e]Faculty of Medicine, Universitas Islam Sultan Agung (UNISSULA),
E-mail: anisayustisiaa@gmail.com[5]
[f]Faculty of Medicine, Universitas Islam Sultan Agung (UNISSULA),
E-mail: Nisyaoktian@std.unissula.ac.id[6]
[g]Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA (UiTM) Pulau Pinang.
E-mail: zuldahl@uitm.edu.my[7]

*Corresponding Author: muhamad_rafiqi@usim.edu.my
Received: 15 February 2023 *Accepted: 16 August 2023* *Published: 30 September 2023*
DOI: https://doi.org.10.33102/jfatwa.vol.28no3.515

ABSTRACT

Stem cells have unprecedented promise for treating disorders that are not amenable to conventional treatment because of their special capacity to maintain, replenish, and repair all tissue types. Stem cell research is currently surrounded by several pressing ethical and challenges as a result of the quick development of biotechnology. Therefore, the purpose of this study is to find out the ethical issues regarding the use of stem cells and correlate from an Islamic perspective, focusing on Malaysia. In this review, we outline an overview of the most significant ethical issues with stem cell application that the community especially Muslims should be aware of. The study applied a library-based methodology and gathered data about stem cells, their use, ethical concerns, and Islamic law with an emphasis on Malaysia from a range of sources, including books, websites and journals. The findings demonstrated that there are three main areas of ethical concern for stem cell technology from an Islamic perspective: human embryonic stem cells, stem cells used for aesthetic purposes, and stem cells used for therapeutic medicine. We attempted to correlate Malaysia's perspective with some of the Islamic perspective's points on all ethical concerns. We discovered that there are certain arguments towards every ethical issue from an Islamic perspective, and we tried to compare it to the perspective from Malaysia. Both the use of current ethical frameworks and careful evaluation from an Islamic perspective are important as this vast and diverse area of stem cell technology progresses, especially in Malaysia.

***Keywords**: Stem cell, ethical, Islamic, Malaysia*

1. INTRODUCTION

Nowadays, scientists are conducting research on a diverse range of subjects, including stem cells. The ability of stem cells to regenerate body parts like cells, tissues, and organs is one of their distinctive features. The phrase stem cell transplantation refers to a broad range of allograft and autologous therapeutic approaches (Lennard et al., 2000). Undifferentiated cells known as stem cells can be found in the embryonic, foetal, and adult phases of life (Kolios et al., 2013). They can give rise to differentiated cells, which serve as the building blocks of tissue and organs. Tissue-specific stem cells are present in differentiated organs during the postnatal and adult phases of development and play a crucial role in organ regeneration after injury (Kolios et al., 2013). Haemopoietic stem cells from a healthy donor who matches the patient's human leukocyte antigen (HLA) type are used in allogeneic transplants. This donor can be a relative or an unrelated volunteer who donated their bone marrow, peripheral blood, or umbilical cord blood. The patient's own bone marrow or peripheral blood stem cells are used in autologous transplants (Lennard et al., 2000).

In 1987, Malaysia conducted the first BMT ever in the nation (Gan et al., 2008). Since then, 1155 transplants have been performed at a total of eight transplant centres. Allogeneic transplants, both myeloablative and nonmyeloablative, accounted for most of the cases. Siblings with identical HLAs make up the great majority of donors (Gan et al., 2008). When conditions are ideal, stem cells produce more cells known as daughter cells. The daughter cells can differentiate into specialised cells with more specialised roles, such as blood cells, brain cells, bone cells, or heart muscle cells, or they can become new stem cells. Stem cells are now one of the alternative treatments for chronic, acute, and degenerative disorders because of their unique characteristics. Furthermore, damaged tissue structures and organs can be rebuilt using stem cells to restore the damage.

Although stem cell biology has made significant progress, ethical issues with embryonic stem cells, tumour growth, and rejection have limited its applicability. However, many of these obstacles are being removed, which could result in important developments in the treatment of diseases (Siti et al., 2022). Therefore, this paper will first analyse based on the previous literature stem cell transplantation and search for the ethical issues related to it, and finally discuss the principles and practices surrounding the Islamic perspective

focusing on Malaysia.

2. LITERATURE REVIEW

Stem cells have the following main characteristics (Kolios et al., 2013): (a) self-renewal (the ability to extensively proliferate), (b) clonality (usually arising from a single cell), and (c) potency (the ability to differentiate into different cell types). The characteristics of different stem cells may vary. For instance, adult tissue stem cells have limited capacity for self-renewal since they do not proliferate widely and can only develop into tissue-specific cells, but embryonic stem cells (ESCs) produced from the blastocyst have greater capacity (Kolios et al., 2013). The average age of the transplant patients was twenty-six. Hematological malignancies were the primary cause of transplantation. Allogeneic transplantation had a 60% overall survival rate while autologous transplantation had a 52% rate (Gan et al., 2008). There are numerous classifications for stem cells: unipotent, oligopotent, totipotent, pluripotent, and multipotent (Wojciech et al., 2019).

The term "potency" refers to a stem cell's capacity to develop into a variety of cell types, and stem cells can be categorised both according to their origin and according to this capacity (Poliwoda, 2022). Totipotent or omnipotent stem cells can differentiate into all cell types needed for adult development and can produce embryonic tissues. When compared to multipotent stem cells, pluripotent stem cells can differentiate into all three germ layers while multipotent stem cells may only differentiate into one type of germ line tissue. Adult organ tissues contain stem cells of the oligopotent and unipotent types, which have chosen a cell lineage and are only capable of differentiating into cells of that lineage. Unipotent stem cells have the most limited ability to differentiate and have the unique ability to divide repeatedly. These are good options for therapeutic usage in regenerative medicine because of their latter feature. These cells can only differentiate into one type of cell, such as dermatocytes (Wojciech et al., 2019).

Another classification is based on their sources, which can be classified into a) embryonic stem cells (ESCs), b) adult stem cells and c) umbilical stem cells (USCs) (Alatyyat et al., 2020). Blastocysts, which are embryos 3 to 5 days after fertilization and contain approximately 150 cells, are used to create embryonic stem cells (ESCs). These cells are pluripotent stem cells, which can differentiate into any type of cell in the body or new cells (Kolios et al., 2013). Scientists have created adult stem cells as an alternative to embryonic stem cells as a source of stem cells. Most adult tissues, including bone marrow and fat, contain small amounts of adult stem cells. When it comes to surplus embryos, the idea goes

that saving lives with the embryos is a better approach to treating them with respect than letting them go to waste. Therefore, it is advised to use extra embryos rather than dispose of them for research that could improve human lives.

Adult stem cells have two unique characteristics (Alatyyat et al., 2020). The first is called plasticity and refers to a cell's capacity to develop outside of the tissue from which it originated. For instance, in addition to developing into teeth tissue, dental pulp stem cells can also develop into neurological tissue. The second characteristic is transdifferentiation, in which one cell type directly transforms into another. For instance, the transdifferentiation of pancreatic and hepatic cells. The only stem cells used regularly in clinical practice are human stem cells (HSCs), which are the most well-studied type of tissue-specific adult stem cells (Alatyyat et al., 2020).

The umbilical cord (UC), often regarded as biological waste, is now recognised as a source of HSCs similar to those seen in bone marrow and peripheral blood (Alatyyat et al., 2020). Two arteries and a vein make up the UC, which is encircled by Wharton's jelly and covered in a basic epithelial layer. Wharton's jelly keeps the blood vessels from clogging, protects them, and gives the cord flexibility. Autologous and allogenic stem cells from the human umbilical cord are a desirable source since they can currently be used to treat a variety of disorders (Alatyyat et al., 2020). In contrast to embryonic and foetal stem cells, human umbilical cord stem cells are an ethically unproblematic, affordable, and easily accessible source of cells. The amnion or placenta, umbilical cord vein, Wharton's jelly, and umbilical cord all contain huge numbers of multipotent stem cells that can differentiate into a wide variety of cell types, which are applicable for stem cell transplantation.

UC are now used to restore the patient's immunological system (Alatyyat et al., 2020). Leukaemia and non-malignant conditions include immunological deficiencies, severe aplastic anaemia, and congenital diseases like thalassemia and sickle cell anaemia can all be treated with transplants from UCSC. Interestingly, cord blood is currently the subject of considerable experimental research in preclinical models of disease pathophysiology. These models can include stroke, cardiac ischemia, and muscle regeneration in addition to their clinical benefit. As a reason, the umbilical cord is the most recent stem cell that scientists are studying at the present. UC possesses many advantages compared to bone marrow stem cells for transplants as summarised in Table 1.

Table 1. Advantages of Umbilical vs Bone Marrow Stem Cell.

Umbilical Stem Cell	Bone Marrow Stem Cell
- Processing and collection have been made much simpler and easier. The harvest of cord blood is rapid and simple, and the subsequent processing takes days or weeks. - The process of cord blood collection can be carried out either before or after placental delivery, is pleasant for both mother and child, requires less strict antigen typing, and carries a low risk of infection transmission. - The cost is much cheaper. - UC blood has more stem cells per unit of volume than normal blood. - UC transplants have a lower incidence of graft-versus-host disease. They are also more tolerant of HLA mismatches than those produced from bone marrow, which is thought to be the cause of this. - UC permits "off-the-shelf" use because they may be kept in a bank.	- In contrast, matching, collection, and processing of bone marrow stem cells need more time. It could take weeks or even months. - Bone marrow transplants require anaesthesia, hospitalization, and post-collection discomfort and pain for the donor. - The cost of bone marrow transplantation and collection of stem cells are more expensive. - Less number per unit of stem cells in the blood - Higher incidence of graft-versus-host disease. They are also less tolerant of HLA mismatches that cause the rejection. - Bone marrow cannot allow "off-the-shelf" use because they are difficult to keep in a bank.

However, there are major limitations to using UC, including delayed engraftment than with bone marrow stem cells, restricted effectiveness of autologous donation due to inherited diseases, and banking concerns such as unclear storage duration, long-term storage-related expense, and quality control (Alatyyat et al., 2020).

3. METHODOLOGY

This study's objective is to analyze stem cell transplantation and explore any associated ethical issues. We look for relevant issues based on the literature that has previously been published with a focus on Malaysia and from the Islamic perspectives. Following a thorough discussion, we established that these three concerns had ethical concerns:

1. Is it ethical to use human embryos in research to obtain stem cells for medical treatment?
2. Is it ethical to only use stem cell transplantation for aesthetic purposes?
3. The likelihood of Graft vs. Host disease in patients receiving stem cell therapy as well as the concern that transplanted cells can develop

unexpectedly for therapeutic purposes. Do we have the authorization to import and export stem cells?

4. RESULTS AND DISCUSSION

Malaysia is a diverse nation with significant populations of Malay, Chinese, and Indian citizens. When discussing ethical concerns regarding stem cells, Malaysia's ethics seem to be influenced by religion; it strikes a reasonable compromise between Islamic ethics and religious inclusivity (Nishakanthi, 2019). This is common in Malaysia, which has a diverse population that includes Muslims, Buddhists, Hindus, Taoists, Sikhs, Christians, and Catholics. The Malaysian stem cell ethics literature revealed legitimate worries that call for forward-thinking theological debate to reach decisions about many aspects of stem cell technology, including research methods and regulation including policy and law-making (Nishakanthi, 2019). However, in this paper, we are very concerned about the Islamic perspective towards stem cell transplantation. We analyzed the theme based on the selected ethical issues and then, discussed them later from the Islamic perspective.

4.1 *First Theme: Human Embryonic Stem Cell*

The Islamic consideration may have risen from the issue of embryo use in human embryonic stem cell research, but the impact is greatly significant as it facilitated in the formulation of the guidelines and regulation of stem cell technology in Malaysia (Nishakanthi, 2019). Following the union of sperm and ovum, a blastocyst forms. Short-lived stem cells, specifically embryonic stem cells, line the inside of it. The inner cell mass (ICM), which transforms into epiblasts and promotes the development of a foetus, and the trophectoderm (TE) are the two separate cell types that make up a blastocyst (Zakrzewski et al., 2019). The control of the ICM microenvironment is carried out by blastocysts. For the embryo to successfully develop and give rise to the placenta, the TE must continue to grow and generate extraembryonic support structures. The ICM cells continue to be fully pluripotent, undifferentiated, and proliferative as the TE develops a specific support structure. Stem cells can develop into any type of organism cell due to their pluripotency (Zakrzewski et al., 2019).

The ICM is where human embryonic stem cells (hESCs) are produced (Sivaraman, 2018). Endoderm, mesoderm, and ectoderm are three types of cell aggregations that form during embryogenesis and give rise to the differentiated cells and tissues of the foetus and, eventually, the adult organism. The frozen embryos developed for infertile couples to use during infertility treatments

through *in vitro* fertilisation programmes are used to obtain embryonic stem cells. The couple frequently produces more embryos than they need and freezes them for later use. Depending on local legal restrictions, couples may use their frozen embryos for stem cell research after they no longer require them for conception. This excess embryo is called a surplus embryo. These are usually frozen embryos that remain after people have decided that their family is complete. Embryonic stem cells from human blastocysts, or 5-day embryos, are isolated and used to create cell lines. Embryonic stem cells can be endlessly cultivated with the aid of fibroblast feeder layers (Nishakanthi, 2019).

Somatic cell nuclear transfer (SCNT) and therapeutic cloning are other methods that can be used to obtain human embryonic stem cells (hESC). A nucleus is removed during SCNT, along with the oocyte's nuclear genome, and is then replaced with the nucleus of an adult cell. A blastocyst is created from the egg after it has been activated, and it has less than 100 cells but includes genetic material that is identical to that of the adult donor cell (Sivaraman, 2018). The blastocyst's stem cells can either be removed or transferred to a uterus, where they could potentially grow into a foetus. Researchers can control the genotype of hESCs using SCNT, which completely removes the possibility of tissue rejection. Cloned stem cells are completely normal, yet cloned animals are abnormal. A gene that is active in a fertilised stem cell also has the same level of activity in a cloned stem cell. According to research, cloned stem cells are not significantly different from non-cloned stem cells at the molecular level (Tachibana et al., 2013). There are differences between these two origins of stem cells as shown in table 2.

Table 2. The Differences of Embryonic and Adult Stem Cell

Embryonic stem cells	Adult stem cells
- It can develop in every cell in the body. - It can differentiate between pluripotent and totipotent. - High quantities can be readily grown in culture. - Uncertain risk of being rejected.	- Usually restricted to differentiating into distinct cell types of the tissue of origin. - It has a predominant multipotent differentiating capacity. - Rare in mature tissue, and a strategy for growing in cell culture has not yet been developed. - Using the patient's cells to produce adult stem cells poses little risk of rejection.

The argument in favour of using surplus embryos to save lives rather than letting them go to waste is the concern of treating the embryos with respect. As

a result, it is recommended to use surplus embryos rather than dispose of them for research that might benefit human lives.

4.1.1 *Islamic Perspective*

Human embryonic stem cells (hESCs) have emerged as a promising avenue for scientific and medical research due to their unique ability to differentiate into various cell types. However, the use of hESCs raises significant ethical concerns, primarily related to the source of these cells, their potential to develop into human beings, and the implications of their manipulation.

1) Source of Human Embryonic Stem Cells:
   One of the most prominent ethical dilemmas surrounding hESC research is the source of these cells. Obtaining hESCs often involves the destruction of human embryos, typically at an early stage of development. This raises concerns about the moral status of the embryo and whether it should be accorded the same rights and protections as a fully developed human being. Opponents of hESCs research argue that the destruction of embryos constitutes the termination of potential human lives and is morally unacceptable.

2) Status of the Embryo:
   The debate over the moral status of the embryo hinges on questions of personhood, potential, and when human life begins. Some ethical perspectives hold that personhood and moral rights are not conferred until a certain developmental milestone, such as the appearance of a functioning nervous system or the ability to feel pain. Others argue that any manipulation or destruction of embryos, regardless of their developmental stage, is ethically objectionable. This debate contributes to the ongoing controversy surrounding hESC research.

3) Consent and Donor Autonomy:
   Obtaining human embryonic stem cells for research purposes requires the informed consent of the donors, who are often couples undergoing in vitro fertilization (IVF) procedures. Ethical concerns arise regarding the extent to which donors truly understand the potential uses of their embryos and the long-term implications of their decisions. It is essential to ensure that donors are fully informed and able to make autonomous choices without undue influence or pressure.

4) Alternatives and Scientific Progress:
Another ethical consideration revolves around the potential benefits of hESC research compared to alternative approaches. Critics argue that the destruction of embryos is unnecessary given the advancements in alternative methods, such as induced pluripotent stem cells (iPSCs) or adult stem cells. These alternatives offer similar regenerative potential without the need to harvest cells from embryos, thereby avoiding the associated ethical concerns.

5) Global Perspectives:
Ethical viewpoints on hESCs research vary across cultures, religions, and societies. Some countries have implemented strict regulations or bans on hESC research due to moral or religious beliefs. Bridging these cultural and ethical differences is crucial to establishing a common ground for international collaboration and research in this field.

As mentioned before, there are two main sources of stem cells, namely adult stem cells and embryonic stem cells. Therefore, there are some disagreements in fatwa regarding the law of getting adult and embryonic stem cells. The Islamic contemporary scholars agreed that it is necessary to use adult stem cells based on the generality and arguments that have been mentioned before. However, they differ in their views on determining the law of obtaining embryonic stem cells. This is because the scholars of the four sects have different views in determining the law related to the foetus that has been miscarriage before 40 days. Scholars have differed in this regard into two opinions:

4.1.2 ***First Opinion****:* Should abort foetus less than 40 days.

Imam Kamal Ibn al-Humam said: "It is required to abort the pregnancy if the appearance of the event is not yet visible" (Ibn al-Humam. Syarh Fath al-Qadir. 3/380).

Imam al-Qalyubi stated: "True, it is required to abort it even with the help of medicines before the spirit is blown, different from the view of Imam al-Ghazali who forbids it" (Al-Qalyubi; Al-Burullusi (Umairah). Hasyiyata Qalyubi wa 'Umairah. 4/244).

Imam al-Lakhmi said: "It is required to abort the foetus before the age of 40 days" (Al-Kharsyi. Syarh Mukhtasar Khalil li al-Kharsyi. 13/160).

Therefore, for this first argument, according to Islamic scholars, it is necessary to abort the foetus before it reaches the age of 40 days because at that point, neither the foetus' appearance nor the spirit's breath on it has been recognized. Thus, the foetus must be aborted for certain purposes like research and medicine in less than 40 days.

4.1.3 ***Second Opinion****:* It is haram to abort a foetus in less than 40 days.

Imam al-Ghazali stated: "The act of aborting the foetus is the same as committing a crime against something that has already existed and succeeded, while that existence has certain stages. The first stage of existence is the attachment of semen in the womb and mixed with the mother's ovum, then it is ready for life. Therefore, damaging the foetus at this stage is a crime" (Al-Ghazali. Ihya' Ulmu al-Din. Page 47).

It is unlawful, according to these scholars, to abort a foetus to obtain embryonic stem cells. This is because it is against Islamic values, manners, and the dignity of the foetus itself. After all, it kills it, and in Islam, a foetus is a created being that is prepared to accept life, and killing it is forbidden (haram). From our point of view, in this case, we tend to say it is forbidden to abort a foetus that is less than 40 days old to obtain stem cells for medical and research purposes because it violates Islamic morals, manners and the dignity of the foetus itself. Furthermore, the act of intentionally aborting a foetus to obtain the stem cells is not the only way to obtain the foetus. It can be obtained in other methods or alternative, more friendly and safe ways, such as taking a foetus that falls spontaneously or a foetus that is aborted on the advice of a doctor and for reasons permitted by Shariah.

Furthermore, while the surplus embryos are often removed and disposed of, they can also be produced using the *in vitro* fertilisation (IVF) technique from extra embryos. Therefore, if a foetus is purposefully aborted, it is against the law to take its embryonic stem cells and use them for something else. The following requirements must be fulfilled if the foetus miscarries spontaneously, is aborted on a doctor's advice for Syariah-permitted reasons, or results from an excess of embryos:

1. Must get permission from parents or next of kin first before getting the foetus or excess embryo.
2. The excess embryos should be obtained through the IVF process for legally married couples.

4.2 *Second Theme: Stem Cell for Aesthetics Purpose*

Among the mesenchymal cell types present in the stromal vascular fraction are adipose-derived stem cells (ASC). Although less effective in cosmeceuticals, ASC has been demonstrated to be useful in dermatology treatments like scalp or hair therapy and skin rejuvenation. Almost all the stem cells used in cosmeceuticals come from plant sources. According to various studies, intradermal injections of ASC every three to five weeks throughout six sessions increase the patient's hair count and density (Fukuoka et al., 2015; Fukuoka et al., 2017). Autologous hair follicle stem cells have also been shown to increase hair density and count in studies (Gentile et al., 2019; Gentile et al., 2020; Perez-Meza et al., 2017). Extensive studies on skin rejuvenation have shown significant improvements in patient satisfaction, pigmentation, wrinkles, pores, and erythema when compared to baseline. According to their study, every patient had improvements in their skin's texture, elasticity, shine, firmness, fine wrinkles, and moisture. When compared to the baseline, a histologic investigation showed increases in collagen and elastic fibres (Elmaadawi et al., 2018).

However, *in vitro* studies showed tumorigenic effects of ASCs in a variety of cancer cell models, including breast, lung, endometrial, and prostate. This is in addition to the benefits of employing stem cells in aesthetics (Elmaadawi et al., 2018). According to these *in vitro* investigations, mesenchymal stem cells (MSC) showed tumour tropism, expanded tumours, encouraged the growth of a fibrovascular stroma that was more favourable to tumour proliferation, and boosted the generation of tumorigenic cytokines. ASCs, however, have been found in other research to exhibit antitumor effects on haematological, lung, pancreatic, and breast cancer cells *in vitro* and in mouse models, along with a decrease in cellular proliferation (Elmaadawi et al., 2018).

The use of stem cell therapy for rejuvenation has two distinct benefits, namely aesthetics and function (Junaidi et al., 2022). Rejuvenation can significantly alter a person's surroundings and career development in some circumstances, while also improving skin health. A higher standard of living can also result from better physical health. The primary objective of stem cell therapy for rejuvenation is to carry out early detection, prevention, treatment, and restoration of various dysfunctions, disorders, and diseases associated with ageing. It also can replace dead cells with new, young cells to extend life in good health.

Other clinical aesthetic uses for stem cells include anti-ageing and age-related malfunction (Junaidi et al., 2022). DNA damage and accumulation occur with

ageing, impairing protein homeostasis, cell function and communication, and normal organ physiology. Dysregulation or exhaustion of the body's stem cells, which impairs homeostasis and hinders tissue repair, is another ageing indicator. Biology stem cells and regenerative medicine are ways to employ stem cells to cure ageing and the dysfunctions linked with it. Aging and stem cells are strongly related to one another.

4.2.1 *Islamic Perspective*

This issue is a contemporary Islamic concern. In the past, the books of Fiqh did not explicitly address the law or the issue of using stem cells. This is probably because, according to technology at the time, it is a brand-new phenomenon that has not been found. As a result, it is a novel finding made possible by technology that is up to date with the times. Thus, it is discussed by modern scholars and Islamic contemporary scholars today in the Fiqh Al-Nawazil chapter. As a result, if a treatment exists that may effectively treat a related illness, we can use it in accordance with the Maqasid Al-Shariah, in which the aim is to preserve human life.

The thought of stem cell rejuvenation is viewed from an Islamic perspective as an action that changes Allah's creation because ageing is a natural process that has been predetermined. The holy Quran also affirmed this argument from Surah At-Tin, verse number 4, saying,

لَقَدْ خَلَقْنَا ٱلْإِنسَٰنَ فِىٓ أَحْسَنِ تَقْوِيمٍ

"We (Allah SWT) have indeed created people in the best condition".

Islamic law also places a strong emphasis on the Fiqhiyyah rule (Qawaid Fiqhiyyah), which provides that damage (dharar), such as danger, poverty, suffering, and misery, should be eradicated as much as is humanly feasible due to the controversy around the possibility that stem cells can promote the growth of cancer cells. This statement is further reinforced by a hadith from Prophet Muhammad SAW stated in Sunan an-Nasa'i, 5099.

عَنْ عَبْدِ اللَّهِ، قَالَ لَعَنَ رَسُولُ اللَّهِ صلى الله عليه وسلم الْوَاشِمَاتِ وَالْمُوتَشِمَاتِ وَالْمُتَنَمِّصَاتِ وَالْمُتَفَلِّجَاتِ لِلْحُسْنِ الْمُغَيِّرَاتِ .

It was narrated that 'Abdullah said: The Messenger of Allah SAW cursed the women who do tattoos and the women who have them done, Al-Mutanammisat, and the women who have their teeth separated for the sake of beauty, those who change (the creation of Allah).

However, Junaidi et al., 2022 stated that from an Islamic viewpoint, using stem cells implies using them in more beneficial ways, not contravening moral and religious principles, do not impact the environment, and respect God the Creator. Junaidi et al., 2022 also stated that according to Islamic law, stem cell therapy can be used to treat the body or slow down the ageing process if it meets certain conditions, including:

1. Intention to seek treatment,
2. Within a certain time frame,
3. With a certain capacity or dose,
4. Does not use embryonic stem cells, and
5. Its use is conscious (not addicted).

4.3 *Third Theme: Stem Cell for Therapeutic Medicine*

According to the Britannica dictionary, therapeutics medicine is the practice of treating and caring for a patient to prevent and treat illness, or of reducing pain or harm. The word is translated as "inclined to serve" from the Greek word therapeutikos. Stem cell therapy has been introduced in Malaysia since 1987, and the field is constantly expanding (Fadilah et al., 2008; Gan et al., 2008). In 1993, University Malaya performed the first bone marrow transplant (BMT) on a child and an adult. In the first transplants, bone marrow (BM), a plentiful source of hemopoietic stem cells (HSC), was utilised. There is a potential for severe morbidity because of the risks associated with general anaesthesia, soft tissue damage, bone injuries, and BM harvesting. The first peripheral blood stem cell transplant (PBSCT) was performed in 1986 and was made possible by the finding that HSCs are present in significant numbers in the peripheral blood for several days after chemotherapy or a course of growth factors (Fadilah et al., 2008).

The concurrent use of mesenchymal stromal cells after allogeneic transplant is one method transplantation researchers are trying to employ to combat the growth in chronic graft versus host disease (GvHD) (Fadilah et al., 2008; Gan GG et al., 2008). Consequently, the Ministry of Health of Malaysia has issued several guidelines, including the National Guidelines for Haemopoietic Stem Cell Therapy (2009), the National Standards for Cord Blood Banking and Transplantation (2008), the National Standards for Stem Cell Transplantation (2009), and the Stem Cell Research & Stem Cell Therapy Guideline of the Malaysian Medical Council (2009). In a nutshell, all ethical issues were addressed in consideration of the Ministry of Malaysia's guidelines. Before the

patients or donors are ready for the transplant, all standards of procedures must be completed thoroughly.

As stated in policy 7.4.1 on organ and tissue allocation and transplant waiting lists, each organ and tissue transplantation service shall have explicit allocation guidelines that consider: (1) Donor-recipient matching criteria; and (2) Priority according to clinical urgency and status. Policy 9 stated that (1) Cell transplantation provides the potential to treat a wide range of human diseases. Emerging technologies and therapies must be controlled to protect the public interest and the safety of patients. (2) Hematopoietic stem cells are currently successfully being transplanted to treat certain disorders. Cord blood is an important alternative source of hematopoietic progenitor cells, (3) The practice of HSC transplantation in the nation shall conform with the National Standards for stem cell transplantation. (4) No embryonic stem cell therapy be permitted.

Furthermore, in accordance with Policy 11 on International Sharing of Organ, Tissue, and Cells, (1) Malaysian donors' organs and/or tissues may not be given to recipients in other countries unless there isn't a suitable local recipient and there has been a prior agreement between that country and Malaysia to share organs and/or tissues, and (2) Importation of tissue from other countries must be done through institutions recognised by the Ministry of Health and in accordance with the policy.

4.3.1 *Islamic Perspective*

One option for treating illness or disorders is the use of stem cells in therapeutic treatment. As a reason, it is permissible according to Islamic laws in line with Maqasid Syariah to preserve life. Therefore, the law of using stem cells in therapeutic treatment and research should be based on the perseverance of life that encourages people to treat and provide quality medicine for the benefit of society. This is based on a Qur'anic verse from Surah Al-Baqarah verse 185 and Al-Maidah verse 2, saying:

يُرِيدُ ٱللَّهُ بِكُمُ ٱلْيُسْرَ وَلَا يُرِيدُ بِكُمُ ٱلْعُسْرَ وَلِتُكْمِلُواْ ٱلْعِدَّةَ وَلِتُكَبِّرُواْ ٱللَّهَ عَلَىٰ مَا هَدَىٰكُمْ وَلَعَلَّكُمْ تَشْكُرُونَ

"Allah intends ease for you, not hardship, so that you may complete the prescribed period and proclaim the greatness of Allah for guiding you, and perhaps you will be grateful".

وَتَعَاوَنُواْ عَلَى ٱلۡبِرِّ وَٱلتَّقۡوَىٰۖ وَلَا تَعَاوَنُواْ عَلَى ٱلۡإِثۡمِ وَٱلۡعُدۡوَٰنِۚ وَٱتَّقُواْ ٱللَّهَۖ إِنَّ ٱللَّهَ شَدِيدُ ٱلۡعِقَابِ

"Cooperate with one another in goodness and righteousness, and do not cooperate in sin and transgression. And be mindful of Allah. Surely Allah is severe in punishment".

Also, narrated by Abu Huraira: the Prophet (ﷺ) said,

عَنْ أَبِي هُرَيْرَةَ . رضى الله عنه . عَنِ النَّبِيِّ صلى الله عليه وسلم قَالَ " مَا أَنْزَلَ اللَّهُ دَاءً إِلاَّ أَنْزَلَ لَهُ شِفَاءً ".

The Prophet (ﷺ) said, "There is no disease that Allah has created, except that He also has created its treatment". (Sahih al-Bukhari, 5678)

Therefore, obtaining stem cells and applying them to medical and research purposes is one way that people might engage in the interests of kindness and piety, whether for themselves, their families, or society as a whole. It may result in a clinical trial that has the best possible impact on the field of health science, offering individuals all over the world a new beginning in the field of medicine. Scientific discoveries today prove that stem cells have many functions and can treat more types of diseases. Thus, through the arguments, the law of using stem cells in therapeutic and medical treatment is necessary and it is to achieve benefits for humankind and treat various types of diseases that exist today.

5. FATWA REGARDING STEM CELLS IN MALAYSIA

According to the 51st National Fatwa Muzakarah Committee on March 11, 2002 (e-fatwa, 2012), it was decided as follows in determining the use of stem cells:

1. Human cloning for any purpose whatsoever is illegal because it is against the nature of human events that have been determined by Allah SWT.
2. The use of stem cells for medical purposes in research that is not from the cloning process is required if it does not conflict with Islamic law.

According to the 67th Muzakarah Committee on February 22, 2005, which also discussed specific laws on therapeutic cloning and stem cell research, it was decided that:

1. Therapeutic cloning for medical treatment such as creating certain cells or replacing organs that have been damaged considering the border measures allowed by Shariah is required.

2. Must use frozen embryos or surplus embryos from the process of fertilization outside the womb (IVF) for research purposes on the condition that the married couple receiving treatment and the research is done before reaching the alaqah (blastocyst) stage.

3. Research on pre-embryos other than for therapeutic purposes must obtain permission from the married couple and pre-embryos resulting from this research, must not be implanted in the womb of the wife or any other woman.

4. Should conduct research on pre-embryos to find out genetic diseases for high-risk couples and only embryos identified as free from diseases can be implanted into the mother's womb during the period of legal marriage. Any commercial research that has nothing to do with maternal or foetal health is not permitted.

5. Genetic engineering treatment of pre-embryos involving the modification of natural characteristics such as hair, hair colour, wisdom, height and so on including sex selection is illegal. However, gender selection is required if the gender factor causes a serious genetic disease that can lead to death.

6. The research must be conducted legally and the research proposal must be clear, scientific and conducted by researchers who have skills, trust and responsibility.

7. Stem cells from the sources mentioned below should be used for medical treatment and research purposes.

On May 25, 2006, the Selangor Darul Ehsan State Mufti Department also stated that stem cells from the specified sources should be used for medical treatment and research through fatwa no. P.U. 13 (Selangor State Mufti Department, 2012). The sources of stem cells are as follows:

1. From an adult (adult stem cells) with permission and the procedure does not cause harm.

2. From a child with the consent of his parents and the procedure does not result in harm.

3. From the baby's urine and umbilical cord blood with the parent's consent.

4. From a foetus that falls spontaneously or is miscarried because of medical treatment permitted by Syariah with the condition of obtaining the consent of its parents, not a foetus that is intentionally aborted or aborted without medical reasons permitted by Syariah.

5. From surplus embryos (excess embryos) that are kept frozen from IVF fertility assistance technology with the condition of obtaining the consent of the parents. Stem cells from embryos produced intentionally with Somatic Cell Nuclear Transfer (SCNT) technology are not allowed based on the method of sad al-zaraie (Blocking the Means). This means that it either helps or harms you in achieving your goals. Sad al-zaraie, in its technical sense, refers to forbidding actions that are lawful but result in evil.

6. CONCLUSION AND RECOMMENDATION

Stem cells can differentiate into many types of cells and there are many different types of stem cells, including perinatal, adult, and embryonic stem cells. The end products include human stem cells (HSC), mesenchymal stem cells (MSC), embryonic stem cells, and induced pluripotent stem cells. Hematopoietic stem cells and cord blood units remain the preferred transplant stem cell options in Malaysia, and it is still against the law to use embryonic stem cells for medical treatment.

The stem cell transplant fundamentally brought the patient more benefits than disadvantages, making it beneficial and non-malevolent. Future research and developments in stem cell transplantation will be necessary. The Muzakarah Fatwa Kebangsaan Malaysia concluded that therapeutic cloning is permitted when done for medical purposes, such as generating new cells or replacing organs that have been damaged while being cognizant of the limits. Future stem cell transplant applications in Malaysia ought to be diverse. The Islamic authorities need to take steps to do detailed research to develop a protocol and fatwa relating to stem cell transplantation in the future.

7. ACKNOWLEDGEMENT

This research project was one of the international modules that integrated *naqli* and *'aqli* in collaboration with Universiti Sains Islam Malaysia (USIM) students and exchange students from Universitas Islam Sultan Agung (UNISSULA) Indonesia. We appreciate all the contributors and authors to this project.

8. REFERENCES

Alatyyat, S. M., Alasmari, H. M., Aleid, O. A., Abdel-Maksoud, M. S., & Elsherbiny, N. (2020). Umbilical cord stem cells: Background, processing and applications. *Tissue & cell*, 65, 101351. https://doi.org/10.1016/j.tice.2020.101351

E-fatwa, Bahagian Pengurusan Fatwa, Jabatan Kemajuan Islam Malaysia (2012). Hukum Pengklonan Terapeutik Dan Penyelidikan Sel Stem (Stem Cell). Retrieved from http://e-smaf.islam.gov.my/e-smaf/fatwa/fatwa/find/pr/11820

Elmaadawi, I. H., Mohamed, B. M., Ibrahim, Z. A. S., Abdou, S. M., El Attar, Y. A., Youssef, A., Shamloula, M. M., Taha, A., Metwally, H. G., El Afandy, M. M., & Salem, M. L. (2018). Stem cell therapy as a novel therapeutic intervention for resistant cases of alopecia areata and androgenetic alopecia. *The Journal of dermatological treatment*, 29(5), 431–440. https://doi.org/10.1080/09546634.2016.1227419

Fadilah, S. A., Leong, C. F., & Cheong, S. K. (2008). Stem cell transplantation in Malaysia and future directions. *The Medical journal of Malaysia*, 63(4), 279–280.

Fukuoka, H., & Suga, H. (2015). Hair Regeneration Treatment Using Adipose-Derived Stem Cell Conditioned Medium: Follow-up With Trichograms. *Eplasty*, 15, e10.

Fukuoka, H., Narita, K., & Suga, H. (2017). Hair Regeneration Therapy: Application of Adipose-Derived Stem Cells. *Current stem cell research & therapy*, 12(7), 531–534. https://doi.org/10.2174/1574888X12666170522114307

Gan, G., Teh, A., Chan, L., Cheong, S., Chang, K., & Ibrahim, H. (2008). Bone marrow and stem cell transplantation: Malaysian experience. *Bone marrow transplantation*, 42 Suppl 1, S103–S105. https://doi.org/10.1038/bmt.2008.129

Gentile P. (2019). Autologous Cellular Method Using Micrografts of Human Adipose Tissue Derived Follicle Stem Cells in Androgenic Alopecia. *International journal of molecular sciences*, 20(14), 3446. https://doi.org/10.3390/ijms20143446

Gentile, P., Scioli, M. G., Cervelli, V., Orlandi, A., & Garcovich, S. (2020). Autologous Micrografts from Scalp Tissue: Trichoscopic and Long-Term Clinical Evaluation in Male and Female Androgenetic Alopecia. *BioMed research international*, 2020, 7397162. https://doi.org/10.1155/2020/7397162

Imran, S. A. M., M Hamizul, M. H. A., Khairul Bariah, A. A. N., Wan Kamarul Zaman, W. S., & Nordin, F. (2022). Regenerative Medicine Therapy in Malaysia: An Update. *Frontiers in bioengineering and biotechnology*, 10, 789644. https://doi.org/10.3389/fbioe.2022.789644

Jabatan Mufti Negeri Selangor Darul Ehsan (2012). Hukum Pengklonan Terapeutik Dan Penyelidikan Sel Stem (Stem Cell). Retrieved from: https://www.muftiselangor.gov.my/fatwa-tahunan/pewartaan/2005-2009/165-hukum-pengklonan-terapeutik-dan-penyelidikan-sel-stem-stem-cell

Junaidi M, Nurhayati N, Budiwati S. (2022). The Use of Stem Cells for Beauty Therapy Islamic Law Perspective.;23624–31. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 5(3), 23624-23631 DOI: https://doi.org/10.33258/birci.v5i3.6377

Kolios, G., & Moodley, Y. (2013). Introduction to stem cells and regenerative medicine. *Respiration; international review of thoracic diseases*, 85(1), 3–10. https://doi.org/10.1159/000345615

Lennard, A. L., & Jackson, G. H. (2000). Stem cell transplantation. *BMJ (Clinical research ed.)*, 321(7258), 433–437. https://doi.org/10.1136/bmj.321.7258.433

Muhamad Rafiqi Hehsan. Q&A Fiqh Perubatan (2014). PTS Publisher.

Nishakanthi G. (2019). The Shortage of Malaysian Stem Cell Ethics in Mainstream Database: a Preliminary Study. *Asian bioethics review*, 11(4), 437–460. https://doi.org/10.1007/s41649-019-00102-5

Pejabat Mufti Wilayah Persekutuan. Bayan Linnas Siri Ke-227 (2020): Penggunaan Sel Stem Dalam Perubatan Menurut Perspektif Syarak. Retrieved from: https://muftiwp.gov.my/artikel/bayan-linnas/4362-bayan-linnas-siri-ke-227-penggunaan-sel-stem-dalam-perubatan-menurut-perspektif-syarak

Perez-Meza, D., Ziering, C., Sforza, M., Krishnan, G., Ball, E., & Daniels, E. (2017). Hair follicle growth by stromal vascular fraction-enhanced adipose transplantation in baldness. *Stem cells and cloning: advances and applications*, 10, 1–10. https://doi.org/10.2147/SCCAA.S131431

Poliwoda, S., Noor, N., Downs, E., Schaaf, A., Cantwell, A., Ganti, L., Kaye, A. D., Mosel, L. I., Carroll, C. B., Viswanath, O., & Urits, I. (2022). Stem cells: a comprehensive review of origins and emerging clinical roles in medical practice. *Orthopedic reviews*, 14(3), 37498. https://doi.org/10.52965/001c.37498

Rakel RE. Therapeutics. Retrieved from: https://www.britannica.com/science/therapeutics

Sivaraman M. A. F. (2018). Using Surplus Embryos and Research Embryos in Stem Cell Research: Ethical Viewpoints of Buddhist, Hindu and Catholic Leaders in Malaysia on the Permissibility of Research. *Science and engineering ethics*, 24(1), 129–149. https://doi.org/10.1007/s11948-017-9893-3

Tachibana, M., Amato, P., Sparman, M., Gutierrez, N. M., Tippner-Hedges, R., Ma, H., Kang, E., Fulati, A., Lee, H. S., Sritanaudomchai, H., Masterson, K., Larson, J., Eaton, D., Sadler-Fredd, K., Battaglia, D., Lee, D., Wu, D., Jensen, J., Patton, P., Gokhale, S., … Mitalipov, S. (2013). Human embryonic stem cells derived by somatic cell nuclear transfer. *Cell*, 153(6), 1228–1238. https://doi.org/10.1016/j.cell.2013.05.006

Zakrzewski, W., Dobrzyński, M., Szymonowicz, M., & Rybak, Z. (2019). Stem cells: past, present, and future. *Stem cell research & therapy*, 10(1), 68. https://doi.org/10.1186/s13287-019-1165-5