Ethical Issues of Developing Biotechnology: An Islamic Perspective

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Introduction

• Heralded by the revelation of the double helical structure of the DNA molecule in 1953, the 21st century is aptly designated the biotechnology century.

• These revolutionary procedures in biotechnology has probed the outermost boundaries of what is scientifically possible and acceptable.

• Some of the issues in biotechnology which are debated contentiously and extensively across all segments of human society, include assisted reproductive technologies, human reproductive cloning, therapeutic cloning, embryo research, genetic engineering, euthanasia, organ transplantation, abortion and contraception.
1. HUMAN REPRODUCTIVE CLONING

• When man was experimenting with cloning in plants, frogs and small marine animals, the Islamic Organisation of Medical Sciences (IOMS) based in Kuwait, convened a seminar in 1983 in which 2 papers were presented which dealt with the potential of human cloning and the shariah perspective on this possibility.

• When the cloning of Dolly the sheep by the technique of somatic cell nuclear transfer was announced in February 1997, the IOmS in their 9th Fiqh Medical seminar updated their juristic opinion on this most contentious issue.
1. HUMAN REPRODUCTIVE CLONING

• Like the IOMS, virtually every Islamic seminar, jurisprudence council or individual scholars have concluded that cloning procedures aimed at producing human clones is not permissible. The majority considered it Haram (not permissible) in all its details.

• Whilst a minority opinion considered in Haram as a way to prevent a cause of harm (the necessity to refrain from causing harm to oneself and others).
  o This latter juristic opinion keeps open the option of readdressing the issue should new information become available and approved by Shariah.

• The use of somatic cell nuclear transfer technology even between husband and wife was also not approved.
1. HUMAN REPRODUCTIVE CLONING

• The ethics aside, the science of human reproductive cloning is not evidence based:

  1) It is an inexact science – there were 277 attempts before Dolly was possible. "Even with mammals the risks are monumental let alone humans, it is criminally irresponsible" says Ian Wilmut, the "creator of Dolly". Failure rates are in excess of 98%.

  2) It is an inefficient technology - Abortion rates are 10x higher, stillbirth rates are 3x higher.

  3) Unproven safety – Dolly suffered from premature rheumatism and early death (she was "a sheep in lamb's clothings"). Other abnormalities include large offspring syndrome, underdeveloped lungs, reduced immunity, increased congenital anomalies. The list of misadventures increase by the day and which infertility expert or cloner is going to publish their failures!

  4) Besides it compromises the gene pool - it reduces genetic variability and diversity. One virulent pathogen maybe sufficient to wipe out the whole clone population.
1. HUMAN REPRODUCTIVE CLONING

- The national and international response to the new technologies of human reproductive cloning have suffered a policy lull.
  - Only a few countries have either drafted or enacted laws to bring human genetic and reproductive technology under responsible societal governance.
  - 77% of countries have not taken action to ban reproductive human cloning.
- Apart from a small minority of “rogue cloners” there is an international consensus against the reproductive cloning of human beings.
- However, the opportunity to elaborate an international convention to ban reproductive human cloning was lost when member countries disagreed on the extent of the ban.
1. HUMAN REPRODUCTIVE CLONING

- The USA and Costa Rica in the Policy on UN Cloning Treaty 2003, proposed a full ban on both reproductive and therapeutic cloning.
- Whilst other member countries supported the Belgium proposal for a partial ban, that is to ban reproductive cloning and allow national discretion on therapeutic cloning.
2. THERAPEUTIC CLONING

• Unfortunately, the confusion at the prospect of cloning has been transferred to therapeutic cloning.
• In therapeutic cloning unlike human reproductive cloning the end point is not cloning a human being.
• This technology involves the production of human clonal embryos for the purpose of harvesting stem-cells, tissues and organs.
  o This would open the potential of curing a whole host of chronic and debilitating diseases including diabetes mellitus, parkinsonism, myocardial infection and spinal injuries.
2. THERAPEUTIC CLONING

- The source of the totipotent stem cells has however been a source of intense controversy.
  - Stem cells found in umbilical cord blood, bone marrow and aborted fetuses are generally acceptable from the ethical and moral point of view. Though less plastic, scarce and sometimes quite inaccessible, there have been some success stories with the use of these non-embryonic stem cells.
  - The use of Embryonic Stem Cells (ESC) is however fraught with highly charged religio-bio-ethical debate.
2. THERAPEUTIC CLONING

- The source of controversy revolves around the various questions about when life becomes a human life; namely:
  a) Is an ovum and sperm a person?
  b) When do the products of conception become a person?
  c) Does a zygote have a full set of human rights?
  d) Does the foetus have a soul?

- The soul is a metaphysical concept which is fundamental in Islam and it defines a human individual. The majority opinion in Islam accepts the 120th day of pregnancy as the time of ensoulment. Even though ensoulment occurs later, the embryo is respected from the onset of fertilization and acquires consideration as a human foetus after implantation.
2. THERAPEUTIC CLONING

• And based on these fundamental premises, at least three Islamic Fiqh (Jurisprudence) Councils have given permission for the use of surplus embryos from IVF laboratories for ESC research.

• However, it is not permissible at this juncture, to consciously generate pre-embryos either by conventional IVF techniques or somatic cell nuclear transfer (SCNT) for ESC research.

• In 2003, 6 (3%) countries have allowed therapeutic cloning whilst 30 (16%) have prohibited it. The 6 countries in favour of allowing therapeutic cloning to proceed within stipulated policy guidelines are China, Singapore, Belgium, UK, Cuba and USA.
2. THERAPEUTIC CLONING

• The Federal Embryo Protection Law (1990) of Germany prohibits both reproductive and therapeutic cloning. This represents the spectrum of countries with “relatively restrictive” laws related to reproductive technologies. Others include Austria, the Scandinavian countries, Ireland, Italy, Netherlands, Spain and Switzerland.

• The other end of the spectrum is represented by the United Kingdom’s Human Fertilisation and Embryology Act (1990) and Human Reproductive Cloning Act (2001) and Singapore’s Bioethics Advisory Committee (BAC) Report on “Ethical, Legal and Social Issues in Human Stem Cell Research, Reproductive and Therapeutic Cloning” which was approved by the government on 18 July 2002. The UK and Singapore “more permissive” regulations allows the generation of embryos by both IVF and SCNT technologies if there is a demonstrable and exceptional need which cannot be met by the use of surplus embryos.
2. THERAPEUTIC CLONING

• The “in-between” policies are demonstrated by the Canadian’s new Assisted Human Reproduction Act (2004) and Australia’s Research Involving Embryos Act (2003).

• They both allow the utilization of surplus IVF embryos for research but prohibit the creation of human embryos for research and SCNT for research and reproduction.

• The current thinking in the Malaysian National Committee on Human Cloning seems to favour this line of thought and legal framework; which is also resonates well with the fatwa issued by the three jurisprudence councils in Jeddah, USA and Jordan.
2. THERAPEUTIC CLONING

- None of the nations in the Middle East have taken legal action to regulate either reproductive or therapeutic cloning.
- In 2003, Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia, Syria, UAE and Yemen voted in favour of Iran’s motion on the UN Cloning Treaty Process, to postpone further discussions for another 2 years.
- Previously it was thought that it would be extremely difficult to develop comprehensive policies to govern human genetic and reproductive technologies.
- Despite the earlier skepticism, various countries have now shown that it is possible to break the policy deadlock and draft legislation to regulate these new technologies of human genetic modification.
2. THERAPEUTIC CLONING

• Despite their different political and social experiences, some of the national policies thus available have exhibited a remarkable sharing of core principles; namely:

a. they affirm technologies with a real chance of preventing or curing disease;
b. they ban technologies which could harm children or open the door to free market eugenics;
c. they ensure research involving embryos is tightly regulated;
d. they establish publicly accountable means to review policies & make new ones;
e. they pose no risk for reproductive rights.
3. GENETIC TECHNOLOGY AND HUMAN EMBRYO RESEARCH

- A variety of inherited diseases may now be diagnosed in the pre-embryo stage prior to implantation into the uterus.
- Highly sensitive polymerase chain reaction (PCR) techniques have enabled the rapid amplification of minute amounts of DNA material from the embryonic cells.
- Fluorescent In Situ Hybridization (FISH) technology with combination chromosomal probes have made possible the genetic analysis of embryonal sex and various aneuploidies.
3. GENETIC TECHNOLOGY AND HUMAN EMBRYO RESEARCH

• The first preimplantation genetic diagnosis (PGD) was achieved in 1989. Since then, well over 200 diseases or conditions have been further isolated with ongoing PGD research.

• The First International Conference on Bioethics in the Muslim World held in Cairo from 10-13 Dec 1991 examined very carefully this area of pre-embryo research.
3. GENETIC TECHNOLOGY AND HUMAN EMBRYO RESEARCH

• Collaborating this with the decisions of other scientific cum Islamic jurisprudence seminars, the following practice guidelines may be summarized:

1. Cryopreserved pre-embryos may be used for research purposes with the free and informed consent of the couple.
2. Research conducted on pre-embryos is limited only to therapeutic research.
3. Any pre-embryos found to be genetically defective maybe rejected from transfer into the uterus after proper counseling by the physician.
4. Research aimed at changing the inherited characteristics of pre-embryos (e.g. hair and eye colour, intelligence, height) including sex selection is forbidden.
3. GENETIC TECHNOLOGY AND HUMAN EMBRYO RESEARCH

5. Sex selection is however permitted if a particular sex predisposes to a serious genetic condition.

6. Research of a commercial nature or not related to the health of the mother or child is not allowed.

7. The research should be undertaken in accredited and reputable research facilities. The medical justification for the research proposal must be sound and scientific and conducted by a skilled and responsible researcher.
4. INHERITABLE GENETIC MODIFICATION

• The designer baby technology or Inheritable Genetic Modification (IGM) has further accentuated the ethical debate often referred to as “slippery slope” issues.

• The world’s first true designer baby, Nash Brown, was born on 29 August 2000. He was conceived specifically for the sake of his six year old sister, Molly who suffered from Fanconi’s Anaemia. His umbilical cord blood was transfused into Molly, with the hope of curing her condition.
4. INHERITABLE GENETIC MODIFICATION

- Another landmark case was in the UK in 2001, where a British couple was given the go ahead by the courts to select an IVF baby who is Thalassaemia free and has a tissue make-up which precisely match their son Zain who suffers from Thalassaemia and does not have a compatible donor. Umbilical cord blood from the IVF baby would be transplanted into Zain to cure his Thalassaemia.

- Table (1) that only 27 (14%) countries have taken action to ban the creation of designer babies.
Table (1): The Jurisprudence of Developing Biotechnology

<table>
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Conclusions

• Islamic medical bioethics is firmly grounded on the fundamental tenets of the Islamic Shariah. The close collaboration between the scholars of jurisprudence and the scientific and medical fraternity has enabled it to keep abreast of the plethora of advancing biotechnologies.

• Despite the wide ranging bio-religio-ethical problems and dilemmas posed by these emerging biotechnologies, Islamic medical bioethics, has provided a “middle of the road” approach moderating between the extremes of conservatism and liberalism. This it does without impeding the genuine and responsible quest for new knowledge and breakthroughs in new research frontiers.

• It has provided a legal framework for responsible societal governance of human genetic and reproductive technologies and banned all forms of free market eugenics.
Thank you

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