Islamic Ethical Views on In Vitro Fertilization and Human Reproductive Cloning

Leena Al-Qasem
Faculty of Graduate Study, Department of Experimental Medicine
Biomedical ethics
March 2003

A Thesis submitter to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements of the Masters degree of science, Specialization in Biomedical Ethics

Biomedical Ethics Unit, Faculty of Medicine
Department of Experimental Medicine
McGill University
Montreal, Quebec
Canada

Your file Votre référence
ISBN: 0-612-88145-8
Our file Notre référence
ISBN: 0-612-88145-8

Acknowledgment

I wish to acknowledge the support and supervision I have received from the members of the Biomedical ethics unit. In particular, I wish to thank my advisor Leigh Turner, PhD. for his supervision and guidance during the whole work, and Dr. K. Glass, DLL for her continuous support.

I am particularly grateful to my mother, father, and the ongoing support and patience of my devoted husband, and three children.

Table of Contents

Abstract:

For Muslims all over the world, whether in North America where they form minorities or in all-Muslim societies, their religion permeates every aspect of their lives and ethical decision-making. It is no wonder that when deliberating the treatment of infertility or the introduction of cloning to the world, Muslims look to their Islamic scholars and await their decision on such matters. They are the ones with the most knowledge of the Quran, Sunnah, and other sources used in Islam. This thesis will explore the ethics of assisted reproduction technologies and human reproductive cloning from an Islamic ethical perspective. I will investigate the principles and regulations that are used today in the Islamic analysis of both practices.

Pour tous les Musulmans du monde, soit en Amérique du Nord ou ils constituent une minorité, soit dans les sociétés entièrement Musulmanes, leur religion contrôle tous les aspects de leur vie et la manière dont ils prennent leurs décisions. Il n'est donc pas étonnant que, dans le domaine du traitement de la fertilité et du clonage, les Musulmans se réfèrent a leurs experts qui ont un connaissance approfondie du Quran, du Sunnah, et d'autres textes relatifs à l'Islam. Cette thèse tantera d'éxposer l'éthique des techniques de reproduction assisté et la reproduction humaine par le clonage à partir d'une perspective d'éthique Islamique. Je rechercherai les principes et règlements en usage aujourd'hui dans le rejet ou l'acceptance de l'une out l'autre pratique.

Islam Ethical views on In Vitro Fertilization and Human Reproductive Cloning

Chapter one: Understanding Islam: Basic sources and principles:

Introduction

As medicine advances, physicians are forced to make decisions on a daily basis that involve not only the clinical aspects of medicine but also the social, religious, and ethical dimensions of health care. The aim of my thesis is to examine new reproductive technologies from the point of view of Sunni Muslims. My goal will be to identify, explain, and analyze the views of contemporary Islamic scholars.

The whole thesis will concentrate on the topics of in vitro fertilization and human reproductive cloning. One chapter will be devoted to discussing each of the chosen topics in detail. The entire work consists of four chapters, including the introduction and the conclusion.

The next chapter will provide an Islamic ethical analysis of In Vitro Fertilization. A definition of infertility will be provided along with list of the causes of this condition, followed by a brief history of assisted reproductive technologies. A subsequent ethical analysis will explore the ethical dilemmas surrounding the issue of assisted reproduction from the point of view of Islam. The chapter will examine arguments concerning the rights of reproduction versus the rights of the child, the right to use unknown gametes versus the rights of the child to know its genetic origin, and whether this technology leads to the exploitation or liberation of women.

The third chapter will examine ethical issues related to human reproductive cloning. After describing different types of cloning procedures, and reviewing the history of cloning technologies, the standard arguments for and against cloning will be examined from the point of view of Islam. The chapter will end with a conclusion based on the evidence presented in the chapter.

The final chapter will derive a conclusion from what I have presented in the preceding chapters as well as my own ethical analysis of the topics addressed in this work.

The main sources I will use are publications resulting from conferences attended by both Islamic scholars and other leaders in health care and medicine from around the world. In such conferences, a committee interprets a theorem, or a doctrine, which lays down the outline of a comprehensive Islamic ideology and its function within the methodology to be adopted. Once this step is completed, analytic research is easier to undertake, more coherent, and easier to apply (Islam 1988). To enable these councils to meet the needs of legislative application, the panel includes experts whose specializations cover all aspects of life, and who are able to clearly perceive any problems presented to them. In addition, they must have complete knowledge of the general rules and principles of the Share'a of Islam. Such councils also include jurists of the highest level possible, knowledgeable in both the sciences of the Share'a and the detailed source evidence (Al-Alawi 1990). One of the major publications, which my work builds upon, is that of the Islamic Organization for Medical Sciences. The IOMS has published a series of books on differing topics concerning different medical advances and the view of Islam regarding these topics. This organization includes Islamic scholars, medical experts, scientists, social workers, and researchers. Their interdisciplinary collaborative approach makes their work unique and valuable.

The work is by no means the most extensive analysis of the Islamic view. Rather I provide a general outline of the major Islamic principles that apply to ethical issues of new reproductive technologies and human reproductive cloning in particular. I explore the ethics of Islam to educate myself and others interested in this area. A major obstacle to my research was the severe lack of books and other references, especially in the English language, about ethical fundamentals of Islam. I will try to explain the Islamic way of thinking in the simplest form I can to enable those unfamiliar with Islam to understand how Muslim concepts and principles are applied to the ethical issues related to these new reproductive

technologies. Although "translating" and interpreting Muslim concepts and interpretive frameworks is not an easy task, I am hopeful a better understanding of the ethics of Islam will result from this thesis.

Islam is a major religion of the world with 1.3 billion followers worldwide. There are 98,165 Muslims in Canada (statistics Canada, 1991), 6 million in the U.S.A., 1.5 million in the U.K, 2.5 million in Germany, and 3 million in France (Belt, 2002). Islam remains a mystery to many inhabitants of the Western world. This is mainly due to the lack of accurate informative and explanatory resources concerning the basic teachings of Islam, as well as the existence of many widespread misconceptions and misunderstandings surrounding this subject. Even Muslims living in the western part of the world are puzzled when faced with the new medical advances. They wonder how to make the right choices under Islamic law. The reason why Islam may seem exotic or even extreme in the modern world is perhaps because religion does not dominate everyday life in the West today. In contrast, religion permeates all aspects of life within Islam, where there is no sharp division between the secular and the sacred. Muslims believe that the Divine Law should be taken very seriously, which is why issues related to religion remain so important. It is important to realize that Islam provides an all-pervasive code of life. In this section I will briefly review broad topics to help the reader better understand the basic tenets of Islam as a religion and everyday guide in order to facilitate the digestion of the arguments that will be developed in the following chapters.

The meaning of Islam:

The word "Islam" means peace and submission. Peace means to be at peace with oneself and surroundings and submission means submission to the will of God (Moududi 1996). There are different schools of jurisprudence within Islam. The majority of believers (approximately 90%) are Sunni Muslims, who are considered to be mainstream traditionalists (Moududi, 1996). Most of the

Muslims in North America are Sunnis. Shiite Muslims constitute a small minority of the Islamic population.

Today the main, if not the only, sources of medical and scientific advancement are non-Islamic countries; for more than three centuries, the world has gradually come to be dominated by Western cultures, lifestyles and modes of thinking. When we examine the modern approach to science we can, without hesitation, discuss the Western approach as the dominant representative. To understand Islamic science, one is required to place oneself within its perspective and accept that it has different means from those of modern science. Islamic science seeks ultimately to attain knowledge that will contribute towards the spiritual perfection and deliverance of anyone capable of studying it.

The sources of Islam:

When a new medical technology is announced, Muslims cannot accept it just because the scientific technique can be done. Rather, Muslims have to return to the sources of their religion to understand whether such a technological advancement could truly be used without disobeying God. This theological framework of interpretation is crucial to all Muslims everywhere in the world, whether they are living in a multicultural society or in a predominantly Muslim society. This is because Islam guides everyday life, from personal relationships with God to the social order. Within Muslim communities, rules that may forbid or allow any medical or scientific technology are understood by Muslims to be based on two primary sources which are the *Quran* and the *sunnah*, and two dependant sources which are *Ijma* and *Qiyas*. Ijma and Qiyas are the secondary or dependent sources of Islamic law or Share'a since they derive their value or authority from the Quran and the Sunnah (Abdalati, 1996).

1. The Quran:

According to Muslims, the Quran is a record of the exact words revealed by God through the Angel Gabriel to the Prophet Mohamed. The Quran is the prime source of every Muslim's faith and practice. It addresses all subjects which concern us as human beings - wisdom, doctrine, worship, and law - but its basic theme is the relationship between God and His creatures. The Quran provides guidelines for a just society, for proper human conduct, and for an equitable economic system.

After the Prophet's death, Islam rapidly expanded far beyond the limits of the area in which it originated. Soon, Islam included many peoples whose native language was not Arabic. Very strict steps were taken to ensure that the text of the Quran did not suffer from this expansion of Islam. Many references discuss how the Quran was preserved. One of these books is by Ahmed Von Denffer, who discusses in detail how the Quran was transmitted through generations (Von Denffer, 1994). Today's copies correspond to the earliest manuscripts. Sir William Muir noted, "There is probably in the world no other book which has remained centuries with so pure a text." (Muir, 1894) Kenneth Cragg reflects: "This phenomenon of Quranic recital means that the text has traversed the centuries in an unbroken living sequence of devotion. It cannot, therefore, be handled as an antiquarian thing, nor as a historical document out of a distant past. The fact of hifz (Quranic Memorization) has made the Quran a present possession through all the lapse of Muslim time and given it a human currency in every generation never allowing its relegation to a bare authority for reference alone" (Cragg, 1973).

To non-Muslims the authenticity of the Quran may be open to question, but to Muslims, current editions of the Quran are all faithful reproductions of the original copies. The latter group believes that there have been no instances of rewriting or corruption of the text over the course of time. Therefore, for Muslims, it is an incontrovertible historical truth that the text of the Holy Quran extant today is, syllable for syllable, exactly the same as the Holy Prophet offered

to the world as the Word of God. According to Muslims, the Quran is in every detail the text that was revealed to the prophet Muhammad fourteen centuries ago. With regard to the interpretation of the Quran over this fourteen-century period, it is important to realize that Islam and Muslims constitute a remarkably homogenous society. To Muslims, the origin of the Quran is never questioned. It is still believed by all Muslims that it is the words of God revealed to the prophet, and that it will remain in its original text until the Day of Judgment. The same interpretation applies to the Sunnah and the Hadith of the Prophet.

During the revelation of the Quran, the prophet explained the meaning of the various verses from the Holy Quran to his companions. Today, the type of knowledge required for interpreting the Quran and making judgments is not acquired through reading one or two books. It requires precise, methodological study to provide the researcher with the tools that will enable him to delve into the field of Islamic thought and Islamic disciplines. Islamic scholars have to know the Quran by heart, learn the Hadith, study the Share'a and other topics while studying in specialized universities such as Alazhar in Egypt, in order for them to be accepted as legitimate scholars.

In the Quran, some verses are fairly straightforward and there is little controversy over their interpretation. Other sections of the Quran are very complex and have deeply hidden meanings. The Quran also contains some scientific information: several sections describe the beginning of life in the uterus and the stages the fetus goes through during its development. These facts only became known later when the field of embryology better developed. What is crucial to remember is that once a certain action is forbidden, it cannot be changed even with the passage of time. According to Islamic jurisprudence, one cannot say that with the change of time, a change of rules is required. When IVF was discovered as a method of treating infertility, Islamic scholars turned their attention first to the physicians who specialized in this field so as to fully understand the procedures involved. Then the Quran and the Sunnah were consulted to determine what insight they provided concerning the creation of children within the bond of marriage and the right to seek treatment for infertility.

The Quran was clear about these rules, as I will explain in more detail later in this chapter.

Within Islam, marriage and the family are the basic structure of any society, and children should only be brought into this life under this bond. If the bond between a man and a woman can only be recognized under the limits of marriage, then the introduction of donor sperms or ova would lead to the introduction of material foreign to this bond. The Quran and the Sunnah strictly forbid this practice. This is how Islamic scholars reached the conclusion that the use of donors in IVF should be rejected. Even today you will not find a single Islamic scholar who would allow the use of donor sperms in IVF, or one who would say that legal adoption might be allowed in certain circumstances (IOMS 1983).

2. The Sunnah:

The *Sunnah* is the second authority for Muslims. From the Islamic standpoint, Sunnah refers to anything narrated or related about the Prophet Mohamed; anything authentically traced to him regarding his speech, actions, traits, and silent approvals, before and after the revelation. The Hadith, which are collections of the sayings of the Prophet, are viewed as a reliably transmitted report of what he said, did, or approved. Muslims regard the Hadith as an excellent guide for living; belief in the Sunnah is part of the Islamic faith. However, the writings are not regarded as having the same status as the Holy Quran. The prophet's actions are, of themselves, rules and authorities Muslims must follow as law. Those concerning his personal affairs are also a source of spiritual reward and blessing and for all Muslims who follow.

The Sunnah is inseparable from the Quran. It clarifies the ambiguities of the Quran, expands on the text of the Quran, specifies what is unconditional, and enables generalizations from what is particularly stated and particularizations from what is generally stated. The details of the acts of formal worship - prayer, fasting, and pilgrimage - were all established and expounded by the Sunnah.

Indeed, the Sunnah is relevant to the practices of every aspect of Islam. It is in accordance with this book that Muslims must design their lives. For this reason, the Sunnah has been studied with almost the same degree of care as the Quran. It has been studied and transmitted as it was recorded down the centuries through succeeding generations.

3. Ijma:

Ijma has been technically defined as the consensus of the jurists of a certain period over a religious matter. Agreement of the scholars of Islam on any religious matter is a source of law in Islam (Kamali, 2000). Ijma was reached on major issues and the differences among them mostly typically concern relatively minor points of law and ritual (Bello, 1989). For example, the time of prayer or fasting in countries where sunrise and sunset times vary considerably from the rest of the world is determined by Ijma. Ijma signifies the importance of delegated legislation to the Muslim community. Muslim society requires this kind of rule-making power to resolve the practical problems of the implementation of the Islamic Share'a.

4. Qiyas:

Qiyas is the fourth important source of Islamic law. Qiyas means to conclude from a given principle embodied in a precedent whether a new case falls under this principle or the strength of a common essential feature called the reason (Fazlur Rahman, 1979). Qiyas or analogy is resorted to when addressing problems where there is no specific provision in the Quran or the Sunnah of the Prophet. When focusing on such issues, scholars have derived law through analogical deduction on the basis of the provisions of the Quran and the Sunnah on some similar situation. The scholars have developed detailed principles of analogical deductions in the books of Islamic jurisprudence (Kamali, 2000). This form of analysis is what was used when studying the place of cloning in Islam.

Since both the Quran and the Sunnah had no specific provision about cloning, the Islamic scholars referred to a situation similar to that of IVF. Since it had been established that the introduction of foreign material within a marriage could not be allowed, the same principle was used to reach a ruling about cloning. I address this topic in detail in the third chapter.

Qiyas in its widest sense, the use of human reason in the elaboration of the law, is termed *Ijtihad* (effort of one's own judgment) and covers a variety of mental processes, ranging from interpretation of texts to the assessment of the authenticity of traditions. This is the method by which the principles established by the Quran, Sunnah, and consensus are to be extended and applied to the solution of problems not expressly regulated therein (Coulson, 1999). The Prophet has permitted Ijtihad, to interpret the general principles of the Quran and the traditions of the Prophet or the Sunnah in cases where a sentence may have one or two or more possible meanings. This can be achieved by comparing one case with another analogous case mentioned in the Quran or Sunnah. It must take into account those things that are permitted as potentially beneficial and those that are prohibited to prevent wrongdoing. The ruling is derived from general statements, or the adoption of a specific interpretation. The role of juristic reasoning is thus completely subordinate to the dictates of divine revelations. Analogical deduction must have its starting point in a principle of the Quran, Sunnah, or consensus. The analogical approach cannot be used to achieve a rule that contradicts anything established by the primary material sources (Coulson, 1999). The right of individual interpretation and the divergence of opinion are confined to issues on which no Ijma had yet been attained and could not be opened up on issues which Ijma had been reached in the early generations (Bello, 1989).

Islamic Law (Share'a):

The *Share'a*, as a code, defines principles on which decisions are made regarding the particulars of specific needs. It covers every aspect of daily individual and collective living. The purpose of Islamic laws is the protection of

individuals' basic human rights including the right to life, property, political and religious freedom. It also safeguards the rights of women and minorities. The code, on which Islamic laws are based, has done well to meet all the requirements of Muslim people throughout the ages, although these needs increasingly surface in a multitude of forms. The Share'a is derived from the four sources mentioned above: the Quran, the Sunnah, Ijma, and Qiyas. After the prophet's death, religious scholars use these resources to determine the place of complicated medical advances in regard to Islamic rules. They discuss the legal implications and parameters of judgment for each new dilemma. Their final verdict is known as a *Fatwa*, which is a very sensitive matter and has a great status in Islam. In delivering a Fatwa, the guidance of the Quran, Sunnah consensus, and analogy are followed. The scholars do not have the right to choose views according to their own desire or individual preferences.

Agreements and disagreements within Islam:

In Islam, there are fundamental norms with which no one disagrees. Core norms includ the belief that there is only One God and the existence of Messengers and Prophets of God. These messengers and prophets include Noah, Abraham, Ishmael, Isaac, Moses, Jesus, and Muhammad. Other core beliefs include the literal truth of the Quran and other divine revelations (Muslims believe in all scriptures and revelations of God, as they were in their complete original versions), belief in the Angels, and belief in the Day of Judgment. All these beliefs are clearly stated in the Quran and also explained in detail by the prophet (Maududi, 1984). The same principle applies to any other matter explicitly stated in the Quran. For example since there is a clear verse in the Quran forbidding adoption as practiced today, all Muslims are expected to forever abide by this rule.

The source of disagreement stems from certain areas where there is no verse in the Quran or in the Hadith to explicitly clarify it. Scholars, in studying the Quranic texts, have differed in their understanding of the purpose of the

Lawgiver. If a word suggested two interpretations, some scholars opted for the literal meaning and some chose a more figurative meaning (Alwari, 1998). The word "meezaan", for example, literally refers to a scale or an instrument for weighing things. Figuratively, it may have the connotation of "justice". Apart from the meanings of individual words, linguistic difficulties arose over questions of grammar. It is common knowledge that a direct imperative of a verb, for example "Do!" often indicates a command to fulfill an obligation; the negative imperative (Don't do!) indicates prohibition. These imperative forms, however, are not always used in this absolute sense. The direct imperative form of a verb may be used, for example, to indicate a commendable course of action, offer guidance, give a warning, or convey some news. Those who are interested in investigating such causes for differences in opinion will find many examples in individual words and grammatical constructions. According to these differences, a text may be regarded, as general or specific, absolute or limited, summarizing ethical standards or clarifying difficult cases (Alwari, 1998).

At the end of this chapter, I would like to emphasize that Islamic Laws are very elaborate. This chapter is just a brief summary of the main sources to aid the reader in understanding the principles which Islamic scholars use to reach their decisions on different dilemmas.

Chapter Two:

Redefining the family after the reproductive revolution: Islamic perspectives

Introduction:

Perhaps nowhere are contemporary ethical concerns more pressing and complex than in the area of reproductive technology. The last two decades of scientific advances have turned fiction to fact. Few contemporary issues stir the public consciousness as dramatically as new reproductive technologies. Innovative infertility treatments have resulted from advances in reproductive medicine in recent years, and public controversies and debates about the moral and social implications of these treatments have often accompanied their introduction into mainstream clinical use. In this chapter, I will begin by giving a brief explanation of what is meant by infertility, provide a survey of its causes, and offer a brief historical account of IVF. I should emphasize that I will not go into detail with all the different types of assisted reproduction. Rather, I will concentrate on IVF and all the ethical issues surrounding it. My analysis will include a detailed analysis of how the dilemma of IVF is viewed in Islam. I will begin with the reproductive revolution and Islam, followed by an analysis of biotechnical methods. I will finally offer an evaluation from the point of view of Islam whether the proposed treatment methods, including IVF, gamete or embryo donation, and surrogacy are to be accepted or rejected. Finally, the conclusion will offer insight into the relationship between Islam and new reproductive technologies.

Infertility:

A couple is considered infertile after unsuccessfully attempting pregnancy for one year. Infertility is termed primary when it occurs without any prior pregnancy and secondary when it follows a previous conception (Kenneth, 1999). Some conditions, such as azoospermia, endometriosis, and tubal occlusion, are

more common in women with primary infertility, but virtually all conditions occur in both settings, making the distinction of little clinical benefit.

Conception requires the juxtaposition of the male and female gametes at the optimal stage of their maturation, followed by transportation of the conceptus to the uterine cavity at a time when the endometrium is supportive to its continued development and implantation. For these events to occur, the male and female reproductive systems must be both anatomically and physiologically intact. In addition, the coitus must occur with sufficient frequency for the semen to be deposited in close temporal relationship to the release of the oocyte from the follicle. Even when fertilization occurs, it is estimated that over 70% fail to develop or become nonviable shortly after implantation. Therefore it is not surprising that 10% to 15% of couples experience infertility. It is remarkable that 80% of couples achieve conception within one year. More precisely, 25% conceive within the first month, 60% in 6 months, 75% in 9 months, and 90% in 18 months (Kenneth, 1999). The steadily decreasing rate of monthly conception demonstrated by these figures most likely reflects a spectrum of fertility extending from highly fertile couples through to those with relative infertility. After 18 months of unprotected sexual intercourse, the remaining couples have a very low monthly conception rate without treatment, and may have absolute defects preventing fertility (sterility).

With the thorough evaluation and application of current treatments short of in vitro fertilization (IVF) or ovum transfer, 50% to 60% of infertile couples will conceive. With the full utility of other techniques, it is anticipated that most couples that pursue all available treatment methods will conceive eventually (Kenneth, 1999).

There are many diverse causes of infertility including male and female factors. They include male coital factor (40 %), ovulatory factor (15-20%), cervical factor (5-10%), uterine- tubal factor (30%), peritoneal factor (40%), and unexplained infertility (5-10 %) (Kenneth, 1999).

History:

At the beginning of the twentieth century, Russian scientists were fertilizing cows, sheep, and horses using the semen taken from the males of these animals. In 1970, the freezing of bull semen was achieved by storing it at temperatures as low as minus 79 degrees (Fasouliotis, 1999).

Chang was the first to perform fertilization outside the uterus when in 1959 he used the sperm of a rabbit to fertilize the ova of another rabbit, and later transfer the products into a surrogate rabbit (Chang, 1959). However, on the human level, Edwards is considered to be the first to attempt fertilization of the ova outside the uterus in 1965 (Brinsden, 2000). He tried to fertilize an ovum in a Petri dish and then to return it into the uterus. The first success was in 1976 when a pregnancy occurred but was an ectopic pregnancy; hence a laparotomy and salpingectomy were performed. The failure to achieve this end continued until 1978 when the first IVF child, Louisa Browne was born (Steptoe, 1978). Later the procedure became so common that by 1986, three thousand infants were born using the same method. Assisted reproduction centers became very widespread.

Treatment:

The last resort for infertile couples with any of the mentioned factors, and for whom all other treatments have failed, is the procedure of IVF and embryo transfer (IVF-ET) or, if the tubes are patent and normal, GIFT. IVF appears to be preferable to surgery because of the more rapid conception rate and the lower ectopic pregnancy rate.

Artificial insemination (AI):

AI is just one of the options that may be considered prior to attempting more involved treatments, such as IVF. AI is recommended for certain causes of infertility such as male factor infertility, hostile cervical mucus, or various

structural abnormalities in the woman. It is a relatively simple procedure that involves injecting a sample of specially treated sperm from the male partner into the female partner's reproductive tract (Hacker, 1998). For most couples, AI is performed with the husband's sperm. However, when the husband's ejaculate contains few or no live sperm, the couple may consider undergoing more advanced procedures including IVF, ICSI, or donor sperm insemination. The pregnancy rates for AI treatment cycles average about 15-20% per cycle when AI is performed for the correct indications.

In Vitro Fertilization (IVF):

The process of IVF involves stimulation of the growth of multiple eggs by the daily injection of hormone medications. (It is also possible to conduct IVF without the use of the hormone medications. In the absence of hormone medications, only one egg is developed and retrieved.

Technique:

The process of IVF begins with the administration of gonadotrophins to induce the maturation of multiple follicles in the ovary. Sequential serum estradiol and ultrasound measurements are performed, and once appropriate follicular development has been achieved, hCG (human chorionic gonadotrophin) is administered to trigger ovulation (Jenning, 1996). There are two major risks of gonadotrophin therapy. The first risk concerns multiple conception (20% with 15% twins and 5% high-order multiple conception) and the second risk is ovarian hyperstimulation syndrome (OHSS) (Kavic, 2001). This syndrome represents an over-expression of the normal ovulatory process occurring in a mild to moderate form in 20% of women treated with gonadotrophin therapy.

Oocyte retrieval using a transvaginal ultrasound-guided technique is scheduled 34 to 36 hours after hCG administration. Once the eggs are retrieved, they are placed in a special fluid medium, and then semen that has been washed

and incubated is placed with the eggs and left for approximately 18 hours. The eggs are removed, passed into a special growth medium, and then examined about 40 hours later. If the eggs have been fertilized and developed normally, the embryos are transferred to the woman's uterus. Typically, multiple embryos are transferred to increase the likelihood of pregnancy (Chervenak, 2001). If more than four eggs develop into embryos, the donor may have the option of cryopreserving the remaining embryos for later thawing and replacement in an IVF cycle (Ludwig, 1999).

Adequate production of progesterone is critical during implantation and early pregnancy. Progesterone is often administered intramuscularly as a daily 50-mg dose. Progesterone supplementation is generally initiated around the time of embryo transfer. When patients conceive, progesterone administration is typically continued until after the luteal-placental shift. Supplemental hCG is also administered once or more during the luteal phase. Both hCG and progesterone are associated with increased pregnancy rates when compared to cases that had no luteal support. Progesterone is associated with a higher pregnancy rate and a lower rate of OHSS than hCG. Embryos are injected through the cervical canal into the uterine cavity. Recently reported rates of multiple conception with successful IVF cycles included 29.6% twins, 6.4% triplets, and 0.6% high-order multiple gestations (Hacker, 1998).

The reproductive revolution and Islam:

The response of people to most new technologies when they are announced, especially when they involve the medical field, is often one of rejection and sometimes one of disgust. The principle cause of this reaction is the lack of knowledge regarding this technology and the spread of misconceptions leading to the technology being regarded as immoral. However, with the attainment of more information and the clarification of misconceptions, people sometimes grow to accept these technologies.

The same process applies to IVF. When it was first introduced, many people considered it unnatural and requested that it be banned. When more information was available to the public, a better understanding emerged and with it came the acceptance of certain practices of IVF, though others remained unacceptable such as AID. However, with the passage of time, what was once rejected became an acceptable practice. AID is currently one of the standard forms of treatment of infertility. It is rarely questioned by the public with the exception of a minority who still feel it should not be allowed.

Within Islam, the matter is different. The passage of time means nothing to the rules set by God and even if people get used to a certain practice and grow to accept it, the matter still remains unlawful under the Islamic law if it is clearly specified in the Quran or by the Prophet.

Marriage and reproduction in Islam:

According to Islamic teachings, the unit of humanity is not man alone or woman alone but rather both together in unison. Hence, within Islam, the unit of humanity is the family (Rauf, 1996). Within Islam, the family institution should be a stable structure, for it is the fulfillment of the two halves of humanity seeking one another, as well as the vessel in which the future generation is conceived, carried, born and raised. The pairing of a man and a woman is not a haphazard matter. In Islam this pairing is a serious event that has to be documented and protected by what is called the tie of marriage or the marriage contract with all its legal consequences: the mutual rights and responsibilities of husband and wife towards one another and their progeny (El-Alami, 1996). It is under the protective umbrella of the marriage contract that the children should be born. In Islam, the right of legitimacy is a basic right and every person has the right to be the legitimate child of their parents. Muslim scholars agree that violation of this closely-knit arrangement can undermine the human society. The family is the foundation of Islamic society. The peace and security offered by a stable family unit is greatly valued, and seen as essential for the spiritual growth of its

members. A harmonious social order is created by the existence of extended families. Children are treasured; they rarely leave home until the time they marry (Doi, 2000).

According to Muslims, God has governed man with the blessing of marriage so as to fulfill his needs in lawful ways. A bond joins a man and woman who want to form a family together.

> {O mankind! Be dutiful to your Lord, Who from a single person (Adam), and from him (Adam) He created his wife [Hawwa (Eve)], and from them both He created many men and women} (4: 1) (Al-Hilali, 1985. P. 110) and {And Allah has made for you Azwaj (mates or wives) of your own kind, and has made for you from your wives, sons and grandsons} (16:72) (Al-Hilali, 1985. P. 343).

The word "zawj" or "azwaj" is used in the Quran to mean a pair or a mate. In general, its usage refers to marriage. The general purpose of marriage is that the sexes can provide company and love to one another, procreate children and live in peace and tranquility by following the commandments of God (Rauf, 1996). Marriage serves as a means of emotional and sexual gratification and also a means of reducing social tensions.

> {It is He who has created you from a single person (Adam), and (then) He has created from him his wife [Hawwa (Eve)], in order that he might enjoy the pleasure of living with her.} (7: 189) (Al-Hilali, 1985. P. 225).

Marriage is regarded as the only possible way for the sexes to unite. To elaborate, women were made to be (1) a mate or companion for man; (2) except for the sex, of the same nature as man, and, therefore, with the same moral and religious rights and duties; and (3) not to be considered as the source of all evil or sin, but rather as a blessing, one of the favors of God. Just as the sons should be a source of strength, so daughters and grandchildren should serve and contribute to the happiness of fathers and grandparents, and are to be looked upon as further blessings. The bond of marriage is built on agreement, freedom of choice, and

kindness. Islam considers marriage one of the most virtuous and approved institutions.

With these Quranic injunctions and the guidance from the Prophet in mind, we shall examine the institution of marriage in the Share'a. Since the family is the nucleus of Islamic society, and marriage is the only way to bring families into existence, the Prophet insisted upon his followers entering into marriage by saying:

> 0 young men, those among you who can support a wife should marry, for it restrains eyes from casting (evil glances). and preserves one from immorality; but those who cannot should devote themselves to fasting for it is a means of controlling sexual desire. (Muslim 1971. 8: 3231)

The Share'a prescribes rules to regulate the functioning of the family so that both spouses can live together in love, security, and tranquility. Within Islam, marriage is a solemn agreement. It is not a matter to be taken lightly. It should be entered with total commitment and full knowledge of what it involves. Your partner should be your choice for life. One should be mature enough to understand the demands of marriage so that the union can be a lasting one. For a marriage to be valid, certain conditions must be met. They include the consent of both the male and the female, the payment of a dowry (which is a gift from the groom to his bride). Furthermore, two witnesses must be present at the time of the writing of the marriage agreement, and the marriage must be publicized (Rauf, 1996).

Marriage in Islam has aspects of both the worship of God and the interaction between human beings. In its worship aspect, marriage is an act pleasing to God because it is in accordance with his commandments that a husband and wife love each other and help each other to make efforts to continue the human race. They nurse and rear their children to become true servants of God. In the aspect of interaction between human beings, marriage constitutes a lawful response to the basic biological instinct to have sexual intercourse and to procreate children. The Share'a has prescribed detailed rules for translating this

response into a living human institution reinforced by a whole framework of legally enforceable rights and duties, not only of the spouses, but also of their offspring.

Parenthood and especially motherhood as Islamic Values:

Motherhood and fatherhood are the two aspects of parenthood that Islam values highly, as evidenced by the following quotations from the holy Quran:

> {And your Lord has decreed that you worship none but Him, and that you be dutiful to your parents. If one of them or both of them attain old age in your life, say not to them a word of disrespect, nor shout at them, but address them in terms of honor. And lower unto them the wing of submission and humility through mercy, and say: My Lord! Bestow on them Your mercy as they did bring me up when I was young} (17:23-24) (Al-Hilali, 1985. P. 356)

The idea of worshipping God is connected to the idea of honoring one's parents. The linkage of respect to parents and the mentioning of it second to the worship of none but God creates a strong impression. God commands good treatment of parents by not letting them hear anything offensive from children. When God forbids speaking and behaving in an obnoxious manner, He commands speaking and behaving in a good manner. He asks Muslims to address parents in terms of honor. There is a double aptness. When the parent is strong and the child is helpless, parental affection is showered on the child: when the child grows up and is strong, and the parent is helpless, can he do less than bestow similar tender care on the parent? Muslims are asked to honor fathers and mothers not merely by respect: "cherishing kindness and humility to parents is commanded" (Ahmed, 1974). The compassionate attitude towards parents is ordained even if they are of different religion. Many sayings of the prophet recommend kind care to parents. One day he said:

> Let him be humbled into dust; let him be humbled into dust. It was said: Allah's Messenger, who is he? He said: He who sees either of his parents

> during their old age or he sees both of them, but he does not enter Paradise (Muslim, 1971. 32: 6189).

Within parenthood, motherhood is given a higher position than paternity. The debt the mother is owed by virtue of carrying the infant through pregnancy to lactation and weaning is very much appreciated and honored within Islam. The Prophet reinforced this by his saying:

> A person came to the Prophet and said: Who among the people is most deserving of a fine treatment from my hand? He said: Your mother. He again said: Then who (is the next one)? He said: Again it is your mother (who deserves the best treatment from you). He said: Then who (is the next one)? He (the Holy Prophet) said: Again, it is your mother. He (again) said: Then who? Thereupon he said: Then it is your father (Muslim, 1971. 32: 6180)

The Quran and Infertility:

According to Islamic doctrine, procreation of the human species is part of the Divine plan. There is no doubt that the normal method of reproduction for humans involves sexual intercourse

> {O mankind! We have created you from a male and female, and made you into nations and tribes, that you may know one another} (49: 13) (Al-Hilali, 1985. P.651)

This is addressed to all mankind and not only to Muslims. Muslims believe that mankind is descended from one pair of parents. Their tribes, races, and nations are convenient labels by which we may know certain differing characteristics. Before God they are all one, and he gets most honor who is most righteous (Ali, 1940). Unfortunately, some marriages are barren. Some cases of infertility respond to medical treatment, while others remain infertile. Muslims believe that these outcomes are in accordance with God's plan.

If we take a look at the Holy Quran, we can clearly see that the designation of infertility or not is set long before the person is born for reasons only known to the creator.

> {To Allah belongs the kingdom of the heavens and the earth. He creates what He wills. He bestows females (offspring) upon whom He wills, and bestows male (offspring) upon whom He wills. Or He bestows both males and females, and He renders barren whom He wills. Verily, He is the All-Knower and is Able to do all things} (42: 49-50) (Al-Hilali, 1985. P.615)

The mystery of sex and parenthood is referred to in a new light. To parents themselves, it is a mystery why a male or female child is given at any birth, or how the balance of the two is achieved within a family or in a large group of mankind, or why in some cases the womb is barren and the would-be parents are denied the joy and responsibilities of parenthood. Within Islam, to have progeny is a great blessing from God. To pursue a remedy for infertility is therefore quite legitimate and should not be considered as rebellion against the fate decreed by God.

The Quran makes reference to at least two Prophets, namely Zakariya and Ibrahim, whose wives could not bear children but eventually did in their old age. The Quran tells us time and again about the keen prayers of Zakariya in this respect.

> {And (remember) Zakariya (Zachariah), when he cried to his Lord: "O My Lord! Leave me not single (childless), though You are the Best of the inheritors." So We answered his call, and We bestowed upon him Yahya (John), and cured his wife (to bear a child) for him. Verily, they used to hasten on to do good deeds, and they used to call on Us with hope and fear, and used to humble themselves before Us} (21: 89-90) (Al-Hilali, 1985. P. 416)

With reference to his wife, the significance is two fold. Her barrenness would be removed, so that she could become a mother, and her spiritual dignity would be raised in becoming the mother of Yahya; and by implication his also, in becoming the father. Muslims who are not blessed with offspring are, generally speaking, hopeful that they will one day be blessed with children in the same way as Prophets Ibrahim and Zakariya were cured of their barrenness. According to the Quran (verse 42: 49-50), no matter how advanced the medical devices are, the cure for primary infertility cannot come from another source other than the Creator Himself according to Islamic teachings.

If it is legitimate (i.e. it is acceptable by the Quran and the Sunnah) to yearn for something and ask God for it, it is without doubt just as legitimate to pursue means that might fulfill it. Attempts to cure infertility are therefore not only permissible, but are a duty so that a couple may contribute to the preservation of the race and supply society with useful human elements to take their place in the future generation. However, according to Muslim scholars, the treatment of infertility should by no means trespass outside boundaries ordained by God. Amongst the sequelae is a real threat to the very existence of the family institution. Since it has become possible to remove sex and reproduction from marriage, the existence of the family is jeopardized, even with the possibility of single parenting which Islam completely rejects (IOMS, 1999). Modern reproductive techniques have been devised, and as far as they solve the problem of many barren marriages they have to be praised and saluted, but the expansion of their application puts them in conflict with Islamic principles in some situations as will be explained later.

According to Muslim thinkers, infertility should be viewed as a "defect" or "disease"(IOMS 1983) and the saying of the Prophet support this:

> There is no disease that Allah has created, except that He also has created its treatment (Albukhari, 1977. 71: 582).

This gives Muslims the impetus to try to do something about their disease. For example, the cause of infertility in the man or woman concerned may be rectified through corrective surgery, as in the case where the fallopian tubes in the case of the woman may be blocked. No doubt trying to resolve the problem of infertility by technological means does not guarantee its solution, but it is a positive attempt in that direction. Methods other than corrective surgery, however, generate certain ethical issues. I will evaluate these techniques by applying the ethical principles of Islamic law.

Artificial Insemination using Husband's Semen (AIH):

From an Islamic perspective, this procedure is acceptable if it remains between husband and wife and is performed during the span of their marriage. Its acceptability is based on the fact that the mating takes place within an authentic marriage contract, the sperm would hopefully fuse with the ovum, and the pregnancy (and baby) is ensured the right of legitimacy with its subsequent legal rights. That the procedure is only permitted within the span of marriage is due to the fact that the marriage contract is broken by death or by divorce (IOMS, 1983). The woman under such circumstances has the right to become another man's wife. The fusion of sperm and ovum (a step further of the sexual intercourse between man and woman) should take place only within the marriage contract. If the woman becomes widowed or divorced then the marriage contract has come to a conclusion and stored semen of the husband would be alien to her. If the husband died but had already deposited semen preserved in cold storage in a semen bank, it cannot be used to impregnate the wife. If this is allowed neither the insemination nor a conceived baby would be within the boundaries of a valid marriage contract. Therefore the baby would thus have been denied its basic right of legitimacy (IOMS, 1983).

Sperm Donors:

The right to procreate with unknown gametes:

Although sperm donation has been occurring for over one hundred years, improved technology resulting from the ability to separate gestational and genetic motherhood has paved the way for ovum donation as well. Though few people in the medical and mental health fields have openly questioned the moral acceptability of gamete donation, the practice raises an important ethical question: Is it morally acceptable to bring a child into the world with an unknown genetic parent? (Crocklin, 1996) (Seibel, 1996)

Donor oocytes may be used in some conditions where the female cannot provide her own eggs due to advanced maternal age or where premature ovarian failure is diagnosed. Therefore, oocytes from younger women (donors) are more likely to produce a successful pregnancy and give the recipient the joy of carrying and delivering a child. Couples that have had IVF treatments, completed their families, and have spare embryos in storage usually donate the embryos. The woman donating the embryos was usually aged 35 or under at the time the embryos were cryopreserved.

The ethics of bringing a child into the world with unknown genetic origins is more questionable today than it was in the past. The concern is whether it may be psychologically or medically harmful to a person to have no information, or little information, about his/her genetic make-up (IOMS, 1999). Respect for persons must logically include the offspring that result from gamete provision. Questions arise about whether a patient's autonomy, in this case the right not to tell one's offspring the truth, should take precedence over the possible harm done to a person if he or she were to go through life being duped about his/her identity and conveying a false medical history.

The right to know the truth about one's genetic origins:

As long as the practice of anonymous sperm donation continues and the laws surrounding it do not change, donor offspring will not have access to information about their biological parents. Although many sperm banks are currently providing extensive information to parents regarding their donor's medical and psychological history, most couples using DI in the U.S are still choosing not to provide information about donors to DI offspring (McWhinnie, 2001).

Separating the various components of parenthood means that individuals and couples can create children who may be deceived about their genetic make-up and possibly about who gestated and gave birth to them (in the case of surrogates or gestational carriers). The use of anonymous sperm or egg donation means that

children may have several half-siblings whom they do not know. Furthermore, the separation of genetic and gestational motherhood may mean that a couple who have donated frozen embryos has several biogenetic children who are being raised by different families, and who know nothing about each other's existence. These are but some of the ethical and psychosocial dilemmas brought about by the new reproductive technologies - dilemmas that couples face as they consider their parenting and treatment options.

The Quran recognizes the vital role that the sperm plays in human reproduction and states:

> {So let man see from what he is created! He is created from a water gushing forth (i.e. the sperm). Proceeding from between the backbone and the ribs} (86:5-7) (Al-Hilali, 1985. P.767).

The Quran warns that this "seed" or sperm should not be misused, in the sense that its emission should occur only in the event of having sex with one's wife. This can be deduced from the verse wherein it describes as one of the qualities of believers that they have sex only with those who are joined to them in the marriage bond (23:5-6).

Procreative liberty: The right to reproduce vs. the best interests of children:

Because of the new reproductive technologies, the question has arisen about whether the right to procreate includes the right to procreate using available technology and/or donor gametes or a host uterus.

The moral right of the coitally infertile to reproduce is based on the same desire for offspring that the coitally fertile have. They too wish to rear children biologically related to them. Their infertility should no more disqualify them from reproductive experiences than physical disability should disqualify persons from walking with mechanical assistance. Being deprived of the ability to reproduce prevents one from an experience that is central to an individual's identity and meaning in life. For many people, reproduction also has religious significance and is experienced as a gift from God. The Islamic view extends from the belief that

the child has the right to be conceived, carried in the womb, brought into the world and raised within marriage. It is through the secure and recognized relationship to his own parents that the child can discover his own identity and achieve his own proper human development. The parents find in their child a confirmation and completion of their reciprocal self-giving. The child is the living image of their love; the permanent sign of their conjugal union; the living and indissoluble concrete expression of their paternity and maternity. By reason of the vocation and social responsibilities of the person, the good of the children and of the parents contributes to the good of civil society. The vitality and stability of society require that children come into the world within a family and that the family be firmly based in marriage.

Recognition of the primacy of procreation does not mean that all reproduction is morally blameless; much less that reproduction is always responsible and praiseworthy and can never be limited. Thus the purpose is to protect children from harm - both physical and psychological - and the duty of the State is to advocate the welfare of children. The question here is whether or not someone should be advocating the rights of children who are not yet born or conceived, and whether we can know, even prior to conception, whether a child will be harmed as a result of the circumstances of its conception or birth.

The question brought forward by Muslim thinkers is whether Islamic law justifies the use of the sperm of someone other than that of the husband in the process of artificially inseminating the woman? In this regard, a former head of the Azhar University, Sheikh Mahmud Shaltut, issued the following religious decrees (fatwa) condemning the use of donor sperm. He states:

> Artificial insemination with the sperm of a foreign person, is, under the Share'a, a grievous crime and a great sin and is tantamount to adultery. For, it is the insertion of the sperm of the foreign person intentionally into a tilth which has not been legally tied to him through the bond of marriage has been condemned and prohibited by the Divine Share'a (IOMS, 1983, P. 277).

Dr. Yusuf al Qaradawi, addressing the question of donor artificial insemination, states:

> Islam safeguards lineage by prohibiting adultery, fornication, and legal adoption, thus keeping the family line unambiguously defined without any foreign element entering into it. It likewise prohibits what is known as artificial insemination if the donor of the sperm is other than that husband (IOMS, 1983, P. 475).

Along the same line of analysis, agreeing with Dr Qaradawi, Sheikh Ebrahim AlQatan states:

> If the fertilization was with the sperm of the husband, it would fall within the boundaries of the Islamic law and therefore be legitimate leading to the birth of a legitimate child providing the parents with psychological and social content. However, if the fertilization was done using sperm from a donor not joined to the woman by a marriage contract, the act will be considered a grave crime - meeting adultery and leading to the same conclusion (IOMS, 1983, P.374)

From an Islamic perspective, under certain circumstances such as the use of donor sperm, the unborn child is robbed of his/her right to legitimacy. This leads to serious social and psychological harms to the child ranging from the lack of social respect within the Islamic society, the giving of the family name to a child that does not belong to it, and the deprivation of the child from inheriting with the other members of the family. All these are serious harms which cannot be denied or ignored. Within Islam, once the teachings of the Quran and the Sunnah have forbidden a matter, or a consensus has been established among the scholars, the longing of the parent for a child does not allow them to make exceptions. They cannot bend the rules and afflict harm on others to achieve their goals.

From the point of view of the Islamic Organization for Medical Sciences, although the procedure can put an end to the problem of a fertile wife of an infertile husband, the practice is unacceptable to Islam. The child is not the fruit of the marriage contract and is therefore robbed of its right to legitimacy. The procedure also entails the lie of registering the baby as the son or daughter of a

man who is not the real father. It leads to confusion of lines of genealogy whose purity is so significant to Muslims. It lies to the child about, and denies him or her, the knowledge of the real father. It absolves the real father of being responsible for his own "flesh and blood". It enhances the chances of inadvertent brother-sister marriages in a community and violates the Islamic legal system of inheritance (IOMS, 1983).

Contract pregnancy, the family, and adoption

Another ethical question arises from the ability to separate genetic from gestation and from raising children: Is it moral to create children from donor gametes when there are already children in the world who have been born and who need homes? The infertile couple could adopt one of these underprivileged children and provide a home for them where they could love, care for, and ensure a better future for them. For those couples where IVF fails and cannot benefit them, adoption could provide a second alternative.

In fact many infertile couples struggle with this issue. Longing for a gestational and genetic connection to their offspring, yet aware that too many children in the world need good homes, many prospective parents wonder if this longing to reproduce should take precedence over the right of existing children to have loving homes. Dr. Naser Fareed Wasil, a leading Mufti of Egypt, argues that infertile couples could have a social and humanitarian function if IVF does not work for them. He states:

> Couples who have been denied the joy of having children of their own, are surely the most suited to care for and provide love for orphaned children while following the rules of God. They could give them homes and a future which their biological parents who abandoned them either intentionally or unintentionally. This is but one form of the mercy of God on his people. (IOMS, 1999, P.446).

From what has been presented above, it can be seen that using any sperm other than that of the husband to impregnate one's wife is considered an

illegitimate act in Islamic law. Moreover, the act of a husband storing his sperm, with the intention that if he dies his sperm can be used to impregnate his wife, is rejected. Under Islamic law, death renders the marriage union void in the sense that a woman can marry someone else after a certain specified period.

In vitro Fertilization:

There is no doubt that this technique is a breakthrough in the management of infertility and is to be praised for the joy and happiness it brought to thousands of households, and for the existence of the many children who would otherwise have never been. So far have no harmful effect on the children has been shown or an increased congenital abnormality rate above that of the general population (Kenneth, 1999). The sex ratio is also the same as for the general population (although the technique entails an opportunity for sex selection).

The Quran teaches that in the creation of mankind, the roles of males and females in the process are recognized. For example, it states:

> {O mankind! We have created you from a male and a female} (49:13) (Al-Hilali, 1985. P. 651)

The Quran states that the union should be legitimated through the marriage bond (23:5-6). Thus, using the ovum, egg, or an embryo of another woman, even though it is transferred in the uterus of one's own wife, would be questionable under Islamic Law. The previously mentioned religious decree of Sheikh Shaltut against artificial insemination with the sperm of a donor, could apply equally, on the basis of analogical reasoning, against the adoption of such techniques to correct infertility.

The Islamic ruling on in vitro fertilization does not deviate from its rulings on mating and reproduction in general that have already been addressed. The procedure is acceptable and commendable, but only if it solely involves sperm

and egg from husband and wife and if it is performed during the span of their marriage.

The triangle formed by father-mother-child should only be three sided, without interjection of other parties. Equivalent to the donation of alien semen is the donation of alien ovum again because a pregnancy would result from two parties not bound by a marriage contract. Embryo adoption involves the transfer of an already fertilized egg from another woman and placing it in the uterus of one's wife. These techniques are chosen if one's wife is not able to ovulate, has no fallopian tubes at all, has something abnormal causing blockage of the fallopian tubes, or has damaged tubes. Clearly these techniques can possibly assist an infertile woman to bear and give birth to a child. The problem is that in the case of embryo adoption, the child would have the genetic complements neither of her husband nor of herself.

Surrogate parenting:

Liberation vs. Exploitation of women for reproductive purposes:

Although there are many who argue that the new reproductive technologies are nothing short of miraculous and provide choices to women and to couples that would otherwise never have been possible, there are others who believe that they pose significant harms to families and women. Assisted reproductive technology is not without medical side effects or risks and people who are desperate for children may not be in the best position to objectively evaluate these risks to themselves or to third parties (Oakley, 1992). The separation of the various components of motherhood means that some women who are not the intended parents (ovum donors and/or surrogates or gestational carriers) are subjected to these risks. Furthermore, financial incentives may be inducements to third parties to ignore these potential harms. Here we see examples wherein concerns about autonomy, beneficence, and justice may collide.

In the simplest case, both sperm and egg may come from the couple wanting to have the child, and then the embryo may be implanted back in the woman. In this case, we may say that the intentional parents (the couple who wants to have the child) are also the genetic parents (the couple who supply the egg and sperm for the embryo), the birth parents (the couple to whom the child is born), and the nurturing parents (the couple who nurture and raise the child). However, it is not uncommon for either the sperm or the egg, or even both, to come from a donor. In those cases, the genetic mother or father are different from the birth mother and the nurturing parents (Shanely, 2001). In some cases the embryo may be implanted in a surrogate, who then bears the child. She is then the birth mother, but she may not be the genetic mother. Nor, if things go according to the plan of the intentional parents, will she be the nurturing mother. The whole point of the process for them is for the surrogate to bear their child for them. The issue of surrogacy is a thorny one, especially in those cases where a surrogate changes her mind and wants to raise the baby herself.

We can easily see the complex possibilities that present themselves. It is possible for a child to have three mothers (Morgan, 1994): a genetic mother, a birth mother, and a nurturing mother. Similarly, a child can have at least two fathers: the genetic father and the nurturing father. Who, then, are the "real" parents? Some see biology as constituting what is most real, and for them the "real" parents are either the genetic parents or, in some cases, the birth mother. Some see relationships and love as being the most "real", and for them the "real" parents are often the nurturing parents.

An unequal bargain:

It is assumed that there is an equal exchange - money paid for the service rendered. In reality the contract between the parties to surrogacy would not exist if the parties were equal (Dougherty, 1992) . The woman must give more than her egg in order to gestate a child - an important gender difference. The relationship that will count is that of the contracts and the fees. To buy a baby one will need

sperm and money. Couples who have both can buy babies (Krimmel, 1983). One of the strongest arguments against baby selling is that if we allowed babies to be sold, some people would be put under a great deal of pressure to sell their babies (Ketchum, 1989). This arbitrary designation of rights hides central social and class issues, which make surrogacy contracts possible. The fact that a surrogate mother enters into a contractual agreement to give up her child would very likely make her an unfit mother from a legal perspective. How could a good mother give up her child? Secondly, the contracting couple is likely to be more financially secure (Morgan, 1994). With IVF, it is not only the sperms that could be sold but the ova and the embryos as well. A black market could be established where poor, uneducated women can be hired more cheaply and controlled more rigidly.

The contracting couple adopts the baby soon after delivery so that they become legal parents of the child. Unlike adoption, a contract is signed before the baby is conceived (Overall, 1987). With the use of surrogacy, the relationship of the parties involved has changed. Many scholars argue that the baby is "commodified".

All people are equal under the umbrella of Islamic law. If rich people start using their money to provide them with children, social equality is dismissed. Women will be used as incubators for babies. There are two major objections here. The first ethical issue concerns the use of a human being as a means to achieve one's ends. This is completely rejected by Islam even if financial compensation is offered. The second objection concerns the legality of the contract. Even if all the parties agree, the surrogate and couple are entering into an agreement which entails the surrogate carrying a fetus whose father she is not married to. This clearly breaks the triangle of the family formed by the husband, mother, and the child.

Commerce:

Many opponents of surrogacy argue that it turns a normal biological function of a woman's body into a commercial contract (Niekerk, 1995), (American college of Obstetrics and Gynecology, 1990), (British Medical Association, 1990). Surrogate services are advertised. Surrogates are recruited and operating agencies make large profits. The commercialism of surrogacy raises fears of black markets and baby selling, turning impoverished women into baby producers and the possibility of selective breeding at a price (Arneson, 1992). Surrogacy degrades a pregnancy to a service and a baby to a product (McLachlan, 2000) (Anderson, 2000). Experience shows that like any other commercial dealing the 'customer' lays down his or her conditions before purchasing the goods. The agency arranges the contract, purchases life insurance for the surrogate's family (should she die during pregnancy or childbirth) and buys life insurance or a will for the child should the (contracting) couple die before the child is born (Fasouliotis, 2000). Generally, the surrogate is artificially inseminated with the sperm from the contracting father. In some cases the child is conceived naturally. The surrogate acts as a gestator or 'incubator' (Lieber, 1992), (Rothman, 1992). What surrogates sell is not their labor but their body itself. Every act that the surrogate performs may be under the scrutiny of the contracting couple (Lindemann, 1992), (Jorgensen, 2000).

Surrogacy is not acceptable within Islam because pregnancy should be a fruit of a legitimate marriage. The question of surrogacy opens another front of debate, as to who should be considered the mother of the child: the one who gave the ovum or the one who carried the baby through pregnancy and gave birth to it. On the one hand the first woman gave the genetic material. On the other hand, the second woman received a few cells that weighed a fraction of a particle of dust, recruited her body systems for its nourishment and growth over nine months of biological and psychological interaction, and bore a baby some seven pounds in weight, out of her own body.

The separation of the "womb" relationship from the "ovary" relationship is a new event. The Quran gives clear guidance and made reference to the womb relation, and it was repeatedly stated in the Quran that our mothers are those (women) who gave birth to us:

> {None can be their mothers except those who gave them birth.} (58:2) (Al-Hilali, 1985. P.691)

The Prophet Mohamed is reported to have said

> The child is to be attributed to one on whose bed it is born. (Muslim, 1971. 8: 3435)

From this statement, a general principle is laid down and that is: a child, legitimate or illegitimate, always has a mother. The mother is the one who gives birth to it. Therefore, the surrogate mother will naturally, truly, and legally be the mother of the child. A child born under the surrogate contract would be illegitimate in the Share'a since the contracting husband had not entered into matrimonial contract with the surrogate mother who gave birth to the child.

Given the above teachings, there is no place for surrogate motherhood within the Islamic system, for the burdens that would ensue from it will far outweigh any benefit. Some of the problems with surrogate motherhood may be enumerated as follows: acceptance of surrogate motherhood would tamper with the ways of God in the normal process of procreation; entice unmarried women to "lease" their wombs for monetary benefits; and tempt married women to resort to this technique in order to relieve themselves of the agony of going through the pains of pregnancy and childbirth.

The Protection of the Lineage:

Within Islam, God is understood to have ordained marriage and forbidden adultery so that paternity may be established without doubt or ambiguity. Through marriage a woman is reserved for one man. It is not allowed for her to be unfaithful to him or to let anyone else have access to what belongs exclusively to him. Thus, every child born to her in wedlock will be her husband's child, without any need for recognition or public proclamation of the fact by him or a corresponding claim on the part of the mother (IOMS, 1983).

The child is an extension of his parents and the bearer of their characteristics. During their lifetime he is the joy of his their eyes, while after their death he represents a continuation of their existence and an embodiment of their immortality. He inherits features and stature as well as mental qualities and traits, the good and the bad, the beautiful as well as the ugly, from his parents. The child is a part of his parents' heart and a piece of their body.

Models for Understanding the Relationship between the Surrogate and the Intending Parents:

There are several ways proposed to attempt to understand the relationship between the surrogate mother and the intentional parents

1. The Contractual Model (Hinman, 2002): Since there is often a contract between the surrogate mother and the intending parents, we are often inclined to understand their relationship primarily in terms of a contract. This model has already been discussed in the previous section.

The Legality of the Contract:

The contract, which the surrogate mother and the married couple enter into, can in no way be justified legally under the Share'a. It would be considered

an invalid contract. This stand may be clarified by pointing out that a sale contract would be legal only if it involved such transactions as are permissible under the Share'a. For example, no transaction involving the sale or purchase of alcohol would legally be valid. In the same manner, the contract between the infertile couple and the surrogate mother is invalid in the sense that (1) it is a contract stipulating the "sale" of a free person; and (2) it involves an element of adulterous implantation (the fertilized egg being implanted not in the wife, but in the womb of the surrogate mother) which was clearly forbidden by the Quran.

2. The Adoption Model (Hinman, 2002)**:** Some scholars have suggested that we understand the relationship between the intending parents and the surrogate in terms of pre-natal adoption (Page, 1985). One of the advantages of such a model is that the adoption model usually has a specified period of time during which the birth mother can change her mind about her decision to allow the baby to be adopted. Moreover, birth mothers receive no payment for their baby, although their living expenses (including medical costs and counseling) may be paid by the intending parents. Such a model seems to avoid the two principal drawbacks of the contractual model, but there are important differences between surrogacy and adoption. First, in adoption, the birth mother is not getting pregnant for the intending parents, and thus there is no direct connection with the intending parents as there is in surrogacy. In recent years, this has changed somewhat, since birth mothers may well be selected – and be emotionally quite close to – the couple that hopes to adopt. Second, there is no genetic connection in adoption between the intending parents and the birth mother, whereas in most cases of surrogacy there is a genetic contribution from at least one of the intending parents. Often the embryo will have no genetic links to the surrogate mother, as it always does in adoption.

The Prohibition of Legal Adoption:

Like peoples of other societies during the course of history, the Arabs prior to Islam used to affiliate anyone they wished to their lineage and family through adoption. A man would adopt any boy of his liking as son, announce the fact to the public, and the boy would become like a son to him, sharing the responsibilities and rights of his adopted family and taking its name. The adoption was effective despite the fact that the adopted son might have a known father and come from a known lineage. The Arabs used to practice adoption the same way as the contemporary West. They gave their name to the adopted child. When the adoptive father died the adopted child inherited like a real child. When the adopted son got married, his wife was considered daughter in law, and if divorced she was forbidden to his father to marry.

The prophet himself had an adopted son called Zeyd. His father was called Haritha, but because of the adoption he was called Zeyd Ibn (son of) Mohamed. Zeyd had been a slave but the prophet saw to his freedom. He lived in the prophet's household and loved the prophet so much that when his real father wanted to take him, he chose to stay in the company of the prophet, so the prophet adopted him. Out of love and appreciation, the prophet saw to his marriage to the prophet's own cousin.

Later, this form of adoption became forbidden by the Quran. The Quranic revelation gave a new legislation:

> {Nor has He made your adopted sons your real sons. That is but your saying with your mouths. But Allah says the truth and He guides to the (right) way. Call them (adopted sons) by (the names of) their fathers: that is more just with Allah. But if you know not their fathers' names, (call them) your brothers in faith}(33:4-5) (Al-Hilali, 1985. P.525-526).

Let us ponder the Quranic words; they signify that the declaration of adoption consists in words having no correspondence with objective reality. A mere pronouncement does not change realities, alter facts, or make a stranger a relative, or an adopted individual a son. If a man calls another's son his son, it

might create complications with natural and normal relationships if taken too literally. It is pointed out that it is only spoken words, and should not be taken literally. The truth is the truth, and cannot be altered by men adopting "sons". Adoption in the technical sense is not allowed. The aim of this rule is to destroy the superstition of erecting false relationships to the detriment or loss of true blood relations. The Quran referred to the Prophet Mohammad in person concerning this issue:

> {Mohammad is not the father of any of your men, but (he is) the apostle of God and the seal of the prophets, and God has full knowledge of all things}(33:40) (Al-Hilali, 1985. P.533)

From that time, Zeyd was again called Zeyd Ibn Haritha and not Ibn Mohammad.

Islam views legal adoption as a falsification of the natural order and of reality. Taking a stranger into the family as one of its members; and allowing him privacy with women who are not his family, nor he theirs, is a deception, for the man's wife is not the adopted son's mother, nor is his daughter the boy's sister nor is his sister the boy's aunt. As the adopted child develops, the women in the household including mother and daughters should follow the Islamic code of social conduct regarding dress and intimacy. In matters of inheritance, the Quran does not recognize any claim except those based on relationship through blood and marriage.

> {But kindred by blood are nearer to one another (regarding inheritance) in the decree ordained by Allah. Verily, Allah is the All-Knowing of everything} (8:75) (Al-Hilali, 1985. P.293)

Moreover, the adopted son acquires a claim on the inheritance of the man and his wife, depriving the rightful, deserving relatives, bonded by blood and genetics, of their inheritance. Such a situation arouses the anger of the real relatives against the adopted son, depriving them of their full inheritance. (Since the Islamic Share'a specifies the share of an individual's property to which each blood relative is entitled, the legal adoption of a child who is not among such

relatives, but by virtue of adoption, is one of the heirs, would naturally create bitterness and hostility among the rightful heirs in an Islamic society.) Frequently, such anger leads to quarrels and to the breaking of relations among relatives.

Islam prohibits the child to claim a lineage other than his own, or to claim as father someone who is not his real father. The Prophet listed this practice among the abominable evils deserving the curse of both the Creator and the Prophet, he said:

> No person who claimed knowingly anyone else as his father besides (his own) committed nothing but infidelity, and he who made a claim of anything, which (in fact) did not belong to him, is not amongst us; he should make his abode in Fire (Muslim, 1971. 1: 0118)

Adopting a Child to Rear and to Educate:

As explained above, the type of adoption which has been abolished by Islam is that kind which makes a boy a member of the family, with all the rights of inheritance, the permissibility of mixing freely with other members of the household, the prohibition of marriage and so on.

But the word "adoption" is also used in another sense, one which is not prohibited by Islam - that is, when a man brings home an orphan or a foundling to rear, to educate, and to treat as his own child. He protects, feeds, clothes, teaches, and loves the child as his own. However, he does not attribute the child to himself, nor does he give him the rights which the Share'a reserves for natural children (IOMS, 1983). This is a meritorious act in God's religion, and the man who does it will be rewarded. If a man has no children of his own, and he wishes to benefit such a child from his wealth, he may give him whatever he wants during his lifetime and may also bequeath to him up to one-third of his inheritance before his death.

3. The Cooperative Model (Hinman, 2002)**:** What is taking place in the ideal relationship between intending parents and surrogate? Let us consider the two parties in the relationship, the intending parents and the surrogate. First, the

intending parents are presumably a couple that either is infertile or is at risk through pregnancy. These "at risk" factors are presumably on the intending mother's side, and usually relate to the physical risks of pregnancy. Presumably, we would look with much greater suspicion at intending parents who wanted to hire a surrogate for reasons of convenience, career, and the like. Second, the surrogate mother usually has special characteristics as well. Although they often welcome the payment, their motives are usually much more than monetary. They understand, often through the experiences of a close friend or family member, how painful it can be for a couple to want to have children but be unable to. They often become surrogates for the purpose of helping a couple that otherwise would be unable to have children. Surrogates become pregnant, not in order to have children of their own, but in order to help others to have children of their own. Indeed, often the babies they have are not genetically their own at all; rather, they are carrying a baby for someone else.

Obviously, there are serious objections within the teachings of Islam if these arguments are accepted. Even if the intentions of the surrogate mother are noble, once it is known that she will be breaking the borders set by the sources of Islam, her best intentions would be irrelevant. If all other legitimate methods of reproduction cannot benefit this couple (including IVF and other methods of assisted reproduction) other people, including doctors, relatives, or friends cannot take on the role of God to be merciful and provide this couple with a child. Muslims accept that there are reasons why God left some marriages infertile, although these explanations might not be obvious to these some couples. To take a child who lacks parentage and raise it up like a son or daughter, catering to its physical, educative and spiritual needs is a great charity in Islam.

Conclusion:

Our exploration has revealed the intensity of the problems these issues pose. Each of these issues, in one way or another, is directly linked to the question of human life.

New Para Biotechnical parenting offers technological measures designed to help infertile couples have children and perpetuate the human race. A Muslim analysis of the ethical issues in biomedical technology derives from the guidance of God, who alone has absolute knowledge of good and bad. The husband and wife engage in the sexual act so the sperm can fertilize the ovum and begin human life. For Muslims though, in reality it is God who blesses some human beings with children while others He chooses to leave barren.

This has raised the question of whether biomedical measures to increase or restore fertility constitute interference with God's ways. This seeming dilemma is addressed by understanding that infertility should be viewed as a "disease." Since the Prophet emphasized that his followers should seek medical aid or attention whenever the need arises, it logically follows that trying to resolve infertility through modern biotechnological means would not be tantamount to denying one's trust in God.

It cannot be denied that biomedical science has made positive contributions towards assisting infertile couples in becoming parents. Yet the technological methods used are sometimes ethically questionable. Thus, the question I addressed is whether such techniques are valid under Islamic law. I have attempted to analyze all of the biotechnical possibilities and have come to the conclusion that within Islamic doctrine, only artificial insemination with the sperm of the husband can be regarded as lawful. All other techniques cannot be legally sanctioned, for they involve an element of adulterous unions and could destroy the institution of marriage. The Quranic verse (42:50) stating that it is within the power of God to leave barren whom He wills enables Muslims to resign themselves to the will of God in the event that both the process of artificial insemination and in vitro fertilization fail and leave them without offspring.

If these two techniques fail, they have the option to adopt a child, preferably an orphan. Besides enjoying the spiritual benefits of this responsibility, they will also have the pleasure of rearing a child who may not legally be adopted by them, yet be psychologically satisfying to care for as if he or she were their own. However, it would have to be emphasized here that adoption in Islam is not the same as adoption as the Western world knows it today.

Chapter Three:

Embryo Splitting and Nuclear Somatic Transfer: Islamic Dimensions of human reproductive Cloning

Introduction:

Human cloning falls conceptually between two other technologies. At one end we have the assisted reproductive technologies, such as in vitro fertilization, whose primary purpose is to enable couples to produce a child with whom they have a biological connection. At the other end we have the emerging technologies of genetic engineering -specifically, gene transfer technologies - whose primary purpose is to produce a child that has certain traits. Many proponents of cloning see it as part of the first technology: cloning is just another way of providing a couple with a biological child they might otherwise be unable to have. Since this goal and these other technologies are acceptable, cloning should be acceptable as well. On the other hand, many opponents of cloning see it as part of the second technology: even though cloning involves the transplantation of an entire nucleus and not of specific genes, it is nevertheless an attempt to produce a child with certain traits. The deep misgivings we may have about the genetic manipulation of offspring should apply to cloning as well. The aim of this chapter is to discuss human reproductive cloning, attempt to dispel popular myths concerning cloning, and set the discussion of ethical issues related to cloning within an Islamic interpretive framework.

To begin, a brief scientific definition will be given of the two methods of cloning and the procedures involved. Next I will trace the historical development of cloning technologies. Finally I provide a comprehensive analysis of the ethical dilemmas related to cloning. One of my main objectives will be to dispel what I regard as the predominant cloning myth held by the public, the idea that my clone will be identical to me in beliefs, personality, and appearance. After this section, I will review many of the arguments against human cloning. The particular arguments I will address include the contention that cloning ought to be

prohibited because the majority feels that it ought to be, and the idea that human cloning is an affront to human dignity. Opponents of cloning have suggested that human cloning will result in instrumentalization, that is, using people as a means rather than treating them as an end. I shall also briefly address the idea that cloning is unnatural and so morally unacceptable. Most importantly, I will explore Islamic responses to ethical dimensions of cloning.

Definition of cloning:

The first usage of the word clone appeared in the language of science at the beginning of the twentieth century to describe "groups of plants that are propagated by the use of any form of vegetative parts" (Silver, 1997). Cloning is the technique of producing a genetically identical duplicate of an organism (Silver, 2001). Identical twins are naturally occurring clones. There are two methods of cloning. The first technique uses nuclear somatic cell transfer or nuclear transplantation, which was used to clone Dolly. This technique has been used extensively in animals and has recently been used as a way of multiplying human embryos. This is achieved by transferring a nucleus from the somatic cell of an adult into an egg whose nucleus had been removed. The second method of cloning is known as cell mass division or embryo splitting, which is the artificial division of a single embryo. This technique replicates the natural process that can give rise to twins. The essential difference between nuclear transplantation and embryo splitting is that while both techniques produce multiples, only nuclear transplantation has the potential to create a clone of an adult organism. Both procedures will be explained in detail.

History of cloning:

A. Nuclear transplantation:

The idea of cloning enticed scientists since 1938. When no one knew what genetic material was or consisted of, the first modern embryologist, Dr. Hans

Sepmann of Germany proposed what he called a "fantastic experiment": that involved removing the nucleus from a cell and replacing it with a nucleus from another cell. In short, he suggested that scientists try to clone. In 1952, the first cloning experiment with frogs was attempted. The sizes of the eggs in the frogs are enormous compared with those of mammals, making them far easier to manipulate. Robert Briggs and T. J. King used a pipette to suck the nucleus from the embryo and added it to the frog egg (Bigger, 1952). The process failed. By 1970 another experiment yields better results: John Gurdon successfully cloned frogs (Gurdon, 1958), (Gurdon 1975). Even though the frogs never reached adulthood, the technique was a landmark. He replaced the nucleus of a frog egg with that of another frog. He later showed that transplanted nuclei could reach the embryonic state.

In 1981, the cloning of mice was claimed. Dr. Karl Illmensee of the University of Geneva and Dr. Peter Hoppe of the Jackson Laboratory in Bar Harbor, Maine, claimed that they had transplanted the nuclei of mouse embryo cells into mouse eggs and produced three live mice that were clones of the embryos (Illmensee, 1981). After a lengthy inquiry, it was discovered that Dr. Illmensee had faked his result. In 1982 Dr. James McGrath and Dr. Davor Solter, working at the Wister Institute in Philadelphia, reported in *Science* journal that they could not repeat the mouse–cloning experiment and concluded that once mouse embryos have reached the two-cell stage, they cannot be used for cloning (McGrath, 1983), (McGrath, 1984). Other investigators confirmed their findings. In 1984 Steen Willadsen reported that he cloned a live lamb from immature sheep embryo cells (Willadsen, 1986). Others later reproduced his experiment, using a variety of animals, including cattle, pigs, goats, rabbits, and rhesus monkeys.

Dr. Neal First of the University of Wisconsin at Madison, who has been Dr. Ian Wilmut's most constant competitor, cloned calves from embryos, that had grown to at least 120 cells in 1994. By 1996, the foundation was laid for cloning adult sheep. Dr. Ian Wilmut of the Roslin Institute in Scotland, repeated Dr. Neal First's experiment with sheep. However, he put embryo cells into a resting state

before transferring their nuclei to sheep eggs. They developed into normal embryo and then into lambs.

In March 1997, an event occurred that has brought the possibility of cloning humans much closer. Scottish researchers announced they had successfully cloned a sheep; they named the clone Dolly (Wilmut, 1997). Cloning of other species had occurred previously, but this was the first mammal cloned from an adult. This accomplishment set off vigorous discussions about the ethics of cloning. On March 14, 1997, President Clinton declared that "The creation miracle reaches beyond laboratory science," and he barred cloning. He also urged a halt to research related to cloning until its ethical impact was better understood. Clinton asked the National Bioethics Advisory Commission, (NABC, 1997) a week before his announcement to review the ramification cloning would have for humans and report back to him in ninety days. He imposed the restriction of federal funds after learning that researchers in Oregon had cloned two rhesus monkeys -the world's first cloned primates- from very early embryo cells. That is not the same as cloning the more sophisticated cells of adults, or even cells from a developing fetus. Clinton asked private research workers, whom his directive did not cover, to voluntarily hold a moratorium until the National Bioethics Advisory Commission could study the matter. Others were afraid that a permanent ban could thwart vital research on how genes are turned on and off inside human cells, a key factor in finding genetic defects and unlocking the secrets of disease.

Many other experiments soon followed in different parts of the world. On July 22nd 1998, Dr. Ryuzo Yanagimachi of the University of Hawaii announced the cloning of mice (Wakayama, 1998). The team had produced 22 mice; 7 of them are clones of clones from the cells of a single mouse. Japanese researchers from Kinki University in Nara, Japan cloned 8 calves from a single adult cow's DNA. They used techniques similar to those which produced "Dolly". Four died shortly after birth due to what the researchers called "environmental factors".

On March 9th 2001, Dr. Zavos and Dr. Antinori announced at the human cloning conference in Rome that they intended to use human cloning technology to allow infertile couples to have biologically related children. Subsequently US

Congressional members proposed a hearing to examine the safety of this proposal, which has now resulted in proposed legislation against reproductive human cloning. By December 2001, Advanced Cell Technology announced that they had cloned an early human embryo from an adult cumulus cell nucleus (one of the cells that surround the egg when it is ovulated). The furthest any of the cloned human embryos developed to was 6 cells. The research has prompted certain infertile couples to hope that they may be able to conceive a biologically related child via this technology. Advanced Cell Technology (ACT), has stressed that its aim is to use the technology as a source of special cells that can be used in novel medical treatments, not to produce genetically identical children.

In 2002, Cibelli and colleagues induced unfertilized female oocytes from monkeys to divide by placing them into a chemical mixture similar to sperm (Cibelli, 2002). The resulting embryo called parthenotes, have unknown developmental potential from birth. Cibelli's team took cells from the inner cell mass of the developing blastocysts and planted them in tissue culture, as if creating a stem cell line, for more than ten months.

B. Cell mass division:

Nature itself is the greatest cloning agent. In about one of every 75 human conceptions, the fertilized ovum splits for some unknown reason and produces monozygotic (identical) twins. Each has a genetic makeup identical to the other. In cloning, this same operation is done intentionally in a laboratory. This form of cloning might be more accurately called "artificial twinning", because it simulates the mechanism by which twins naturally develop. Cloning of embryos has been used in animal breeding since the late 1980's, and in mice experiments since the late 1970's.

The methods used have been understood for many years and actually used to clone embryos in cattle and sheep. The first publicly announced human cloning was done by Robert J. Stillman and his team at the George Washington Medical Center in Washington D.C. (Harris, 1997) They took 17 flawed human embryos,

which would have died within days no matter how they were treated since they were derived from an ovum that had been fertilized by two sperm. This resulted in an extra set of chromosomes. These ova were successfully split in October of 1994, each producing one or more clones.

Cloning Techniques:

A. Nuclear transplantation:

With the exception of the sperm and egg, every cell in the body contains all of the genetic material in its DNA to theoretically create an exact clone of the original body. But cells have been biochemically programmed to perform limited functions. The other functions are turned off. Most scientists had believed that such differentiated cells could not be reprogrammed to be capable of behaving as a fertilized egg. However Wilmut's research proved them wrong.

In the case of "Dolly", a cell was taken from the mammary tissue of a mature six-year-old sheep while its DNA was in a dormant state. The process involves enucleating the sheep's ovum and replacing it with a nucleus of another cell. The egg is then placed between two electrodes and a direct electric current is passed through it. This process breaks down the membrane separating the nucleus from the rest of the egg and allows the contents to fuse together. The egg is then transferred to the womb of a surrogate mother and develops in the normal way (Wilmut, 2001). Out of 277 attempts at cell fusion, only 29 began to divide. These were all implanted in ewes. Thirteen became pregnant but only one lamb, Dolly, was born.

B. Cell Mass division:

Cell mass division starts with a standard in vitro fertilization procedure. Sperm and an egg cell are mixed together on a glass dish. After conception, the zygote (fertilized egg) is allowed to develop into a blastula (a hollow mass of cells). The zygote divides first into two cells, then four, then eight, etc. A

chemical is added to the dish to remove the "zona pellucida" covering. This material provides the cells with the nutrients needed to promote cell division. With the covering removed, the blastula is divided into individual cells, which are deposited on individual dishes. They are then coated with an artificial zona pellucida and allowed to divide and develop (Wilmut, 2001). The experiment by Sillman et al. showed that the best results could be obtained by interrupting the zygote at the two-cell stage. Many of these pairs of zygotes were able to develop to the 32-cell stage.

Islam and the ethics of human reproductive cloning:

Islamic scholars share the same concerns as the rest of the world over cloning. However, there are arguments that are unique to Islam in refuting cloning as a legitimate practice. As humans we have the ability to transfer some of our genes to our offspring. The advent of human cloning could have a major impact on all societies, and to determine whether Islam condones cloning or not we need to analyze cloning based on a thorough understanding of Islamic Law and ethics. Perhaps this is the question that has to be asked immediately: Is cloning ethically justifiable under the Islamic law and what are the implications of this new biological technology? Muslims should also be concerned whether it is permissible according to the Quran and Sunnah or not. What does Islam say about the permissibility of cloning? Dr. Yusuf Al-Qaradawi, when asked if cloning was interference in the creation of God or a challenge to God's will, asserted in no uncertain terms:

> Oh no, no one can challenge or oppose God's will. Hence, if the matter is achieved then it is certainly under the will of God. Nothing can be created without God's will creating it. Our search is whether the matter is licit or not (Sachedina)

The Islamic Fiqh Council first contacted the Organization of Muslim Doctors in Kuwait and organized a preliminary conference in Casablanca. Then the issue was discussed in the meeting of 1997. Medical experts also invited to the

meeting explained the process and its implications to the Academy. The members of the council explored two issues regarding cloning. First, they explored whether God's attribute as the Creator will be affected by cloning. There was a consensus that cloning does not bring into question any Islamic belief in any way. God is the Creator of the universe but He has established the system of cause-and-effect in this world (Muhsin, 2001). Muslims believe that God is the ultimate creator because God clearly created somatic and reproductive cells. Scientists are in fact only manipulating God's creation and using the cause and effect that God has created. God is the only one capable of creating beings from nothing. In the conference they gave the example of "sowing a seed in the ground. The planting itself is the cause but only God produces the effect from it in the form of a plant. Similarly cloning is a cause and only through God's Will can it produce the effect. Just as the person sowing the seed is not the creator of the resulting plant, so the cloning technician is not the creator of the resulting animal. God alone is the Creator and all creation takes place solely through His Will". According to Islam, even when scientists are capable of creating an embryo from any cell in the human body, the soul cannot be breathed into that embryo unless God wills it (IOMS, 1999). Many embryo transfers fail and in Islamic thinking, as discussed in the infertility section, this practice can only be achieved once God wills to provide the couple with offspring.

The conclusion was reached by asking a question: are scientists challenging God and replacing His role in creation? The answer will clearly be negative. Scientists are using the material already created by God, specifically the ova, and the somatic cells. It would then follow that to refute cloning on this basis would also be false.

And secondly, regarding the question of permissibility, the members of the Islamic Fiqh concluded after their discussion that the extension of cloning to human beings would generate extremely complex and intractable social and moral problems. Therefore they concluded that human cloning should not be permitted (Muhsin, 2001).

Another Islamic body, which discussed cloning, was the Islamic Organization for Medical sciences. The Seminar emphasized that:

> Not everything that is practicable is necessarily applicable, but should be free of any harmful effects and in line with the rules of Share'a. Since some of the untoward effects do not become apparent until some time later, it is important to give full consideration and adequate time to the issues involved and take all possible precautions. In any case, human cloning is still a long way away, and the evaluation of its immediate advantages and disadvantages may vary with the passage of time. It would, even, be premature to say that after so many years of genetic engineering in plants, its safety for humans has been definitely established. Its applications in animals are as yet in its very early stages. Unpredictability is probably the greatest concern in this respect. Close monitoring of plant and animal cloning experiments must, therefore, continue for a considerable time (IOMS, 1999. P511).

The conference concluded that embryonic splitting could be viewed as a method of assisted reproduction if the clones are implanted at the same time into the uterus and no copies are frozen for later use. They also emphasized that cloning may only be permissible provided that the procedure was limited to married couples after obtaining the consent of both. Only the sperm of the husband should be used to fertilize the ovum obtained from the wife. The resulting embryos should then be reimplanted into the uterus of the wife and no third party should be involved. Furthermore, the procedure should be performed while the marriage is valid, i.e. it cannot be done after divorce, or the death of one of the partners. Enough precautions should be taken to ensure that no mixing occurs between the embryos of different couples, and that the extra embryos created should be left to expire.

However, when the conference considered nuclear transplantation, the members completely prohibited this process because in Islam it is the source of the sperm that fertilizes the ovum that is important. In a marriage, the ovum from the wife must be fertilized with the sperm of the husband. When the sperm and the egg from the husband and wife are not used, the linkage between the two is lost and the child cannot be considered legitimate. As follows from the first point, the child that results from cloning would not be the husband's son and therefore

cannot be named after him. I will further elaborate on this point in the following section. This child will be considered an orphan and all the accompanying psychological and social harms will apply to him.

As we proceed to understand the ethical issues associated with cloning, at the center of the debate in Islam is going to be the question of the ways in which cloning might affect human relationships (IOMS, 1999). Islam regards interpersonal relationships as fundamental to human religious life. For instance, Dr. Al-Qaradawi raises a fundamental question about the impact of this technology on human life. He asks whether such a process creates disorder in human life by interfering with God's created nature (Muhsin, 2001). It is only then that we can assess the gravity of the situation created by the possibility of cloning a human being.

The Ethical Dimension of the Issue:

Until the late 1990s, there were few ethical (Allmers, 1997) (Kass, 1998), social, or legal (Robertson, 1998) (Carment, 1986) discussions about human cloning via nuclear transplantation, since the scientific consensus was that such a procedure was not biologically possible. With the appearance of Dolly, the situation changed. Although human cloning has become feasible, we may doubt that the practice will come into widespread use. Because of the many unresolved issues, many scientists said that human cloning should be postponed until such questions were answered. They believe that the ban is reasonable and that we should proceed with caution (Andrew, 1999). There are genuine ethical concerns involved with the potential for human cloning. Currently, arguments opposing cloning seem to trump arguments in favor of cloning.

Some of the arguments made by Islamic scholars against cloning share a similar basis as those made by other thinkers and scientists against cloning. It is important to state from the outset that despite the plurality of reasoning and judicial formulations based on independent research and interpretation of normative legal sources in Islamic tradition, there is a consensus among Muslim

religious experts on human cloning. In the section that follows, the major arguments for and against cloning will be explored. The arguments based on misconceptions will be discussed separately. It is interesting to note that the strongest arguments made to support cloning stem from the aspect of promoting reproduction and how cloning could be used to address some of the shortcomings of IVF. I will begin by examining the arguments made to support cloning.

Arguments supporting human cloning:

1. Reproductive freedom:

Since one of the main principles of ethics is autonomy, it is not surprising that this principle is used to counter opposition toward cloning. For many infertile couples, cloning technology, once perfected, will offer them the only way possible to reproduce. In some cases, human cloning could be the only avenue for individuals to procreate and maintain a biological connection to the child created. However, in other cases, different means of procreation would also be possible. Cloning could be used, for example, by an infertile couple who are not expected to benefit from the assisted reproduction techniques used now, or parents carrying an autosomal recessive or dominant disease with a 25% or a 50% chance (respectively) of transmitting the disease to their child (Brock, 1998). It could also be used by parents who think cloning is the best solution to avoid having to go through prenatal testing and later of having to terminate the pregnancy if the fetus is affected (McGee, 2000). Some women can only supply a single egg, which makes their chances of becoming pregnant slim. In conventional in vitro fertilization, doctors attempt to start with many ova, fertilize each with sperm and implant all of them in the woman's womb in the hope that one will result in pregnancy. Through the use of embryo cloning, that egg might be divided into 8 zygotes for implanting, and the duplicate tested for a disease or disorder. The chance of those women becoming pregnant would be much greater. If one clone were free of genetic defects, then the other clone would be free as well. The latter

could be implanted in the woman and allowed to mature to term. Bans on cloning would condemn these people to infertility which might otherwise be cured.

In Islam, the basic human right of reproduction is highly respected and a cure for infertility is encouraged as long as the restrictions discussed earlier in chapter two are recognized. Autonomy and freedom do not override the necessities of faithful obedience to religious laws if a procedure that a person intends to undergo is against the teachings of Islam, as set forth by the Quran, Sunnah, or a consensus reached by the Islamic scholars. If the conclusion reached by a consensus is that cloning is prohibited by the central sources of Islam, autonomy would lose its persuasive power and would have no value because within Islam the word of God should prevail.

2. The organ reservoir:

The second argument in favor of cloning revolves mainly around the theme of using the twinning type of cloning in providing much needed organs for transplantation (Brock, 1998). Human cloning would solve the problem of finding a transplant donor who is an acceptable organ or tissue match and would eliminate, or drastically reduce, the risk of transplant rejection by the host. Also cloning could produce a reservoir of "spare parts" if fertilized ova could be cloned into multiple zygotes; one could be implanted in the woman and allowed to develop into a normal baby; the other zygotes could be frozen for future use. In the event that the child required a bone marrow transplant, one of the zygotes could be taken out of storage, implanted, allowed maturing to contribute some of its spare bone marrow to its "earlier" identical twin. It is perhaps unavoidable at this point to bring in the instrumentalization argument. The idea of using an individual as a means, rather than treating them as an end, is sometimes termed instrumentalization. The consultation document of the Human Genetics Advisory Commission (Klotzko, 2001), identifies the cloning of a sibling of a dying child, in order to supply compatible organs or tissues, as instrumental.

The teachings of Islam do not allow instrumentalization due to the honor given to mankind in the Quran and the value of each and every person. It would be degrading to humans to be utilized as organ sources being created solely for the provision of organs for others, specifically if these organs are essential for life. As Dr Naser Fareed Wasil, says:

> Human cloning for the benefit of another human being has its own risks and harms and may, one day, lead to humans being the center of experiments in "farms" being raised for the sole purpose of benefiting others, the same way animals and plants are used (IOMS, 1999, P.458).

Sheikh Mohamed Alsalami joins Dr Wasil in his opinion and states:

> By obtaining a clone of the twin and preserving it to be a source of spare parts is degrading to the value of humans since they are both creations of God and are equal whether deposited into the uterus or cryopreserved (IOMS, 1999, P.403).

According to core Islamic moral norms, humans cannot be used in any way that strips them of their dignity and value as full humans beings. The motives of the parents carry no weight, as they have no right to produce a child as a "spare" for another sibling even if the procedure is a simple one such as a bone marrow aspiration. The key question here is: do embryos have a right to life? If they do it would seem unjustified to sacrifice the life of one embryo for another embryo or fully-grown human being (Barnnigan, 2001). According to Islam, embryos are considered a precious creation of God and although an embryo is not capable of desiring, it has the potential of developing into a creature that can; and therefore Islam gives embryos the right to life (IOMS, 1999).

3. Advancing scientific knowledge:

Perhaps the strongest argument supporting cloning is that human cloning and research on human cloning might make possible important advances in scientific knowledge concerning human development (Brock, 1998). Cloning

might produce greater understanding of the causes of miscarriages. This might lead to a treatment to prevent spontaneous abortions. This would be of immense help for women who cannot bring a fetus to term. It might lead to an understanding of the mechanisms by which a morula attaches itself to the wall of the uterus. This might generate new, effective contraceptives that exhibit very few side effects. Furthermore, the rapid growth of the human morula is similar to the rate at which cancer cells propagate. Cancer researchers believe that if a method is found to stop the division of a human ovum then a technique for terminating the growth of a cancer might be found. Treatments for damage to the brain or nervous system might be possible due to cloning. Damaged nerve tissue in adults does not regenerate on its own. However, stem cells might be capable of repairing the tissue. Because of the large number of stem cells required, human embryo cloning would be essential.

Although the benefits of cloning discussed here have a large potential of advancing research and medical knowledge, their efficacy remains uncertain for many reasons. First, there remains an element of uncertainty with any new technology. The path of cloning research has not yet become clear. Secondly, the use of humans in research on cloning may be compatible with the ethical and legal standards known today. Questions arise as to how and from whom consent should be obtained for cloning, and whether cloning is ethically sound if we know in advance that the sole purpose for it is the production of humans to benefit of others. Third, if the knowledge that would be obtained from cloning could be gained through another method which does not involve such complicated ethical issues, why choose cloning? A detailed assessment of the moral rights that would be violated, and harms produced by research on or using human cloning, must be carried out (Brock, 1998).

In Islam, although knowledge should be sought and scientists should be respected, the use of human embryos as a means of research is objectionable. According to Islamic doctrine, all forms of life should be honored as a divine creation.

Argument opposing human reproductive cloning:

Ethical concerns about human clones involve the risks and uncertainties associated with the current state of cloning technology. This technology has not yet been tested with human subjects, and scientists must admit the possibility of mutation or other biological damage. Accordingly, the NBAC report concluded "at this time, it is morally unacceptable for anyone in the public or private sector, whether in a research or clinical setting, to attempt to create a child using somatic cell nuclear transfer cloning." (NBAC, 1997). Such efforts, it stated, would pose "unacceptable risks to the fetus and/or potential child." The ethical issues of greatest importance in the cloning debate, however, do not involve possible failures of cloning technology, but rather the consequences of its success.

1. The unnaturalness of cloning:

The concept of cloning humans has become victim of what is called the "Yuk factor" (Kass, 1998), which is a shorthand term for describing the visceral fear and unease generated in the public by new biomedical advances. The variety of derogatory adjectives associated with human cloning such as, "revolting", "repugnant", "repulsive" and "grotesque" are illustrative of that fact. Indeed, many bioethics committees have suggested that these feelings are indicative of the immorality of cloning. For example, the report of the NBAC (National Bioethics Advisory Commission), repeatedly cited the "strong discomfort, even revulsion" of most Americans against cloning as if revulsion was itself "a moral argument against such cloning" (Pence, 1998). This stance is also a feature of Leon Kass's essay, "The Wisdom of Repugnance". Both he and NBAC seem to be subscribing to a doctrine often dubbed sentimental morality. The idea that "where people's moral sentiments are outraged by the very idea of something, is of itself a show that what outrages them contravenes morality"(Harris, 1998).

Cloning does deviate from our natural means of reproduction, but this fact alone is not sufficient to render it immoral. If unnaturalness were indicative of the

ethical unacceptability of a practice, then the whole of modern medicine would be rendered immoral. The most frequently used counter-argument against the idea that our emotions of unease and disgust play a crucial role in determining whether human cloning (or indeed any other new technology or practice) is morally permissible, is the observation that our reactions to new technology and practices change. Some of yesterday's "repugnancies" are today calmly accepted. The idea that feelings change somewhat undermines Kass's view that the emotions act like extrasensory receptors that detect right and wrong. However, I am not convinced that the mere fact that we become accustomed to a new technology, and begin to accommodate and accept it, serves as a valid argument for it. For example, when IVF was first announced, the practice was opposed by many people. However, IVF is now a generally acceptable method of reproduction. All that is happening is that our distaste is turning to approval. Our feelings of empathy for infertile couples lead to the use of donor sperms and ova.

However, if we appeal to the teachings of Islam, even when a society as a whole learns to accept a certain technology, for example the use of donor sperm, our feelings of its acceptability do not matter. This is true even if they extend from the need to help others if the method has been forbidden. The harms that will grow out of the use of this technology are greater than its benefits. Once this is determined, then we can say that a certain action is immoral. We cannot build our conclusions on feelings alone.

2. Individual and social harms:

Another strong argument against cloning adopts the perspective of the right of a child to an open future (Burley, 1999), claiming that cloning would violate this right (Brock, 1998). It will seem that one's life has already been lived and played out by another, that one's fate is already determined, and so the later twin will lose the freedom of becoming his/her own self. For example, a child might be constantly compared to the adult from whom he was cloned, and thereby burdened with oppressive expectations. Even worse, the parents might actually

limit the child's opportunities for growth and development. Finally, regardless of his parents' conduct or attitudes, a child might be burdened by the thought that he is a copy and not an "original". The child's sense of self-worth, individuality, or dignity would thus be difficult to sustain (Davis, 2001). How should we respond to these concerns? There are two main points to be discussed here. The first consideration relates to human dignity and the second concern is connected to misunderstandings regarding genetic and personal identity.

In what follows, I shall examine the claim that cloning is offensive to human dignity. Appeals to human dignity and our moral obligation to protect it have been an almost universal feature of the official responses to cloning, as well as a stable argument in more popular commentaries provided by the media. The statement from Dr. Hiroshii, director of the World Health Organization (WHO) is a perfect example. Dr. Hiroshii states:

> WHO considers the use of cloning for the replication of human individuals to be an ethically unacceptable act as it would violate some of the basic principles that govern medically assisted procreation. These include respect for the dignity of the human being (Harris, 1997).

UNESCO takes a similar line in its "Universal Declaration on the Human Genome and Human Rights" by stating:

> Practices which are contrary to human dignity such as the reproductive cloning of human beings shall not be permitted.

An Islamic thinker, Dr Ahmed Rajai Aljundi makes the same point.

> Our irresponsible actions in the field of human creation, I am afraid, will lead to the deprivation of our humanity to a frightening level [...] the deletion of sexual reproduction will dehumanize us to the level of animals, from which we had been honored (IOMS, 1999, P. 141-)

Before I explore the question of whether cloning is contrary to human dignity, we need to be clear about what this concept actually is. Dignity seems to be connected with the idea that humans have certain fundamental needs, desires

and attributes. Thus, to treat someone with dignity is to recognize and respect these needs, desires, and attributes.

When we turn to the question of what human dignity is, we cannot avoid turning to Kant's doctrine of "Respect for persons". Kant believed that we should use a person never simply as a means but also treat them as an end. Applying this to persons, we can say that the meaning of the injunction to treat and regard people not merely as means but also as ends, is that we ought to treat them as valuable in themselves and not only as useful instruments to our own goals. Kant felt that the distinctive feature of a human was his rational will (Rachels, 1999). This faculty gives a person his distinctive ability to choose for himself, and to formulate purposes, plans and policies of his own. Humans alone can act from reasons, as opposed to being acted upon from external causes. Kant claimed that it was inconsistent with treating an individual as a free and rational being to ever use him as a mere means of satisfying our own goals. To do so denies him dignity, his autonomy.

Islam, we might say, agrees partially with Kant in that humans should never be used a mere means to achieve the goals that we need. Man is highly honored by God and to be treated instrumentally would clearly violate this honor given to him. Dr Wasil argues that human dignity does not allow the use of humans for experiments.

> Man was created to rule the earth and all the creatures on it including the animals and the plants, which were made to benefit him. If we treat humans the same way we treat animals and plants we are stripping him from his higher level created to him by God and lowering him to the level of animals and plants. Such an act is considered as dehumanizing and undignifying to humans (IOMS, 1999, P.431-2)

However, the notion that what makes us humans is our rational will would exclude many, such as embryos and people in a persistent vegetative state. The loss of our rational will and the ability to make choices does not exclude us from the human race. As long as the signs of life are present a human should be respected and his dignity ensured (IOMS, 1985). In the context of cloning, if we

use people or siblings to provide organs for others, this would deprive them of their dignity as well as deny a child the right to be born within the bonds of a family, which will lead to the impossibility having of legitimacy and dignity.

It cannot be denied that once the clone knows that he/she was created for the sole reason of saving the other twin, questioning the love of the parents to him/her could not be minimized. The mystery of who the real parents are and the disruption of the relationship with the other members of the family would have negative effects on the clone. Dr. Hasan Al-Shafai makes this argument:

> A clone will be deprived of the intimate relationship that normally exists between blood relatives. These feelings are essential for every human being and their deletion will lead to social and psychological harms (IOMS, 1999, P. 220).

Dr. Mohamed Al-ashqar makes the same argument:

> Islam protects the family since it is considered to be the ideal environment for rearing children. Cloning would adversely affect the family. The clone will not know his origin, and even if he did, the legitimate relationship between son and father will be destroyed (IOMS, 1999, P.337).

Within an Islamic framework, once the relationship between family members cannot be exclusively defined, the very fundamental of the family structure, which in Islam is essential, will be destroyed. How could the love of the "parents" and the function of the family be preserved if a child grows up knowing her mother is her sister, her grandmother is her mother and her father is her brother-in-law. The psychological harms to this child do not only exist because of the uncertainty of the family relations but more importantly from the loss of a legitimate relationship with the other members of the family (IOMS, 1999).

The fundamental ethical question, as Dr Al-Qaradawi states, is whether this procedure interferes with growing up in a family that is founded upon fatherhood and motherhood. It is in a family that the child is nurtured to become a person. In addition, Dr. Al-Qaradawi says, since God has placed in each man and woman an instinct to procreate, why would there be a need of marriage if cloning could create an individual? The other argument against cloning explored by Dr.

Al-Qaradawi is based on the Quranic notion about variations among peoples as a sign from God who created human beings in different forms and colors, just as He created them distinct from other animals. This variety reflects the richness of life. Such a resemblance through "copying" might even lead to the errors of marital relationships where spouses will not be able to recognize their partners, leading to serious social and ethical consequences. However, Dr. Al-Qaradawi maintains that the technology can be used to overcome certain hereditary diseases, such as infertility, as long as it does not lead to aggression in other areas. It comes as no surprise then that one of the major arguments against cloning is that it would destroy the meaning of a family; which is valued by all the religions and is protected and supported by them. In Islam, families are the best environments for a young human being, from infancy into adulthood, to nourish, grow, learn, explore and feel safe.

> {And among His signs is this, that He created for you wives from among yourselves, that you may find repose in them, and He has put between you affection and mercy. Verily, in that are indeed signs for a people who reflect} (30: 21) (Al-Hilali, 1985, P.511).

This verse refers to the wonderful mystery of sex. Children arise from the union of the sexes. It is always the female sex that brings forth the offspring, whether female or male. And the father is as necessary as the mother for bringing forth daughters. Within Islam, Unregenerate man is understood to be pugnacious, but rest and tranquility are found in the normal relations of a father and mother dwelling together and raising a family. According to Islam, a man's chivalry to the opposite sex is natural and God-given. Abdullah Yousif Ali in his commentary on this verse mentions that:

> The friendship of two men between each other is quite different in quality and temper from the feeling which un-spoilt nature expects as between men and women. There is a special kind of love and tenderness between them. And as women are the weaker vessel that tenderness may form a certain aspect be likened to mercy, the protecting kindness which the strong should give to the weak(Ali, 1940. P.200).

According to the teachings of Islam, if cloning is allowed it will create problems related to the family structure e.g. if a nucleus is taken from the husband and implanted into the uterus of his wife, does this make the clone the wife's brother in law, or her son? Is the husband the father or the brother? Is the grandfather the father or the grandfather? Since the relationship is not clear between the clone and other family members this will raise complications later in life regarding internal family matters such as inheritance, custody, expenses, etc. which Islam has obligated Muslims to preserve and maintain.

Dr. Hasan Al-Shazli argues along the same line:

> Cloning entails the disruption of the family system, the definitions of motherhood and fatherhood, and the relationship of the family members to each other. Is the clone to be considered as a son or a brother, is the surrogate mother to be considered as a mother or sister-in-law, and how is the clone to be fitted into the inheritance system set by God (IOMS, 1999, P.282).

Dr Mohamed al-Ashqar also argues:

> Cloning raises many controversial questions. Is the person being cloned the father of the clone of the brother. If a woman is being cloned, does the woman's father become the father of the clone or does the clone have no father at all. These controversies which are hard to answer, create complications in matters such as inheritance, prohibition of certain marriages, and other rights and duties concerning the family structure leading to serious harms on society as a whole (IOMS, 1999, P.340).

According to Islamic law, God created human beings through a family system. Thus, the proper and acceptable way of producing children is through the joining of males and females in marriages. In this way the family is preserved. The children born in this way carry the genes of both parents and this combination gives them identity, balance and a wholesome personality. Islam does not allow producing children outside of marriage. A woman is not allowed to carry the fertilized ovum of a person to whom she is not married.

If we go back to the principles used to conclude that the introduction of a third party into the reproductive process between a man and his wife is not allowed in Islam, as in the case of surrogacy or using donor sperm, we can see that both methods were refused on the basis that genetic material should only come from the parents of that child. Now let us apply the same rule to cloning. If we use the example I have given above where a nucleus is taken from a man and is implanted in his wife, one would have to ask the question: what is the source of the sperm that helped to create that cell in the first place? In natural fertilization and when the process takes place within the bond of marriage, which is the only way accepted by Islam, the sperm of the father which has 23 chromosomes joins with the ovum of the mother which also has 23 chromosomes. Hence, a total of 46 chromosomes are there, half from the father and half from the mother. Cloning of humans would be done by taking a somatic cell from the male, extracting its nucleus, and merging it with a female's egg after removing the egg's own nucleus. This male nucleus in a female egg would be transferred to a woman's womb grow, become a fetus and then a baby, which is a duplicate of the original male from whose body the cell was taken. The genetic material contained in that cell came from the parents of that person i.e. the grandparents. Again Dr. Mohamed Al-Ashqar states:

> If a somatic cell is extracted for the husband, the origin of the genetic material is from the sperm of his farther. The action of transferring the clone into the uterus of the wife therefore, entails the occupation of her uterus with the products of conception that did not originate from her husband's semen. This is strictly rejected by Islam (IOMS, 1999, P.341)

Therefore even when the embryo (clone) is transferred into the uterus of the wife of the person to be cloned, and even if the pregnancy is carried to term, the wife would under the Islamic law still be considered as the mother. The real father of that child is in reality the grandfather. The cloned person would therefore be the twin or the brother of the clone and not the father at all. If we agree that the source of the clone has been determined according to Islamic thinking, the child cannot be claimed the son of the cloned person and cannot be given the name of

the cloned person. This analogy is similar to adoption. The teachings of the Prophet confirm this. Ibn Abbas said that the Prophet said:

> No person who claimed knowingly anyone else as his father besides (his own) committed nothing but infidelity, and he who made a claim of anything, which (in fact) did not belong to him, is not amongst us; he should make his abode in Fire (Muslim, 1971. 1: 0118).

In this Hadith, the prophet is warning his companions against claiming a person as a father, who in reality is not the real father. At the same time he warns against giving one's names to a child who is not one's own. He explains to them that whoever does so and goes against the teachings of God will not be considered as a Muslim and will be punished by God.

It can then easily be seen how the production of children through cloning prevents applying many of the Share'a rules, such as the rules of marriage, kinship, alimony, fatherhood, legitimate inheritance, and custody in addition to many others. If inheritance is considered as an example, who should the clone inherit from, the father or the brother? If this relationship cannot be determined then how could other matters be settled? Should the parents decide to adopt the child produced by cloning, then the restrictions concerning adoption which have been explained earlier must be adhered to. For example the child cannot be given the name of the adopting father and he/she cannot inherit the family they are raised in.

4. Shortening the life expectancy of the clone:

Another troubling point, which was put forward to the Islamic Organization for Medical Sciences by Dr Ahmed Algundi, assistant general secretary of the organization evolved around the point that every cell in the human body has a predestined age (IOMS, 1999). If a cell is taken from a 50 year old to be cloned, what will be the age of the clone? What will be the life expectancy of the clone? Is it going to be shorter or as long as the original person? Cells seem to have a defined life span built into them. The cloning technique

could take many years off their life. However, with the possibility of the use of stem cells, this argument loses its strength.

From an Islamic perspective, the shortening of the life expectancy was argued from a second angle. The Islamic scholars argued that since in cloning the relationship between the family members is not clear, intermarriages could occur for example between an uncle and his niece by marriage, or an aunt and her nephew by marriage. This would, with the passage of time, lead to the weakening of the human race. Dr. Naser Fareed Wasil says:

> Islam encourages people to seek the best characteristics, whether physical or mental, in their partners so their progeny would be strong and fit. For this reason the marriage between certain relatives is forbidden in Islam e.g. between son and mother, man and aunt etc which had been detailed in the Quranic verse (4: 23) (IOMS, 1999, P.431).

This claim is built on the basis that these intermarriages lead to the concentration of certain traits and weaknesses within a family as well as genetic disorders. This principle can be applied to cloning. Nuclear transfer means that the offspring of a certain couple will carry this weakness within the family because the source of diversity is deleted i.e. sexual reproduction. If this continued, the life expectancy of the clone's offspring would certainly be shortened, and would continually with each generation if cloning continued.

Another argument, which stems from the first, mentions that achieving success with human clones will involve the destruction of many human embryos. Early attempts may result in humans with major deformities or other problems. There is no guarantee that the first cloned humans will be normal. They might suffer from some disorder that is not detectable by ultrasound or may be born disabled. Who would be responsible for them? Dr Abdulrazaq Alshygi, Assistant Dean in the University of Kuwait, raised all these questions. He states that it seems unjust to engage in this research without any clear indication of the effects.

> It is logical to object to the creation of deformed embryos and then their destruction if the status and value of every human being within Islamic thinking is understood (IOMS, 1999, P.183)

5.Immoral and exploitative motives:

The fifth argument used by those opposing cloning argues that some governments or other groups, for immoral and exploitative purposes, might use human cloning for commercial interests and financial gain (Brock, 1998). A country might finance a program similar to that of Nazi Germany whereby humans were bred to maximize certain traits. Once the "perfect human" was developed, embryo cloning could be used to replicate that individual and conceivably produce unlimited numbers of clones. The same approach could be used to create a genetic underclass e.g. individuals with sub-normal intelligence and above normal strength. There are powerful leaders in every generation who will seek to abuse this technology for their own purposes (IOMS, 1999). Going ahead with cloning makes this far more likely.

I would argue that although some leaders or even scientists might have bad intentions of creating a certain breed of humans, this line of arguing is not very convincing for two reasons. First, one cannot withhold the beneficial aspects of a certain procedure just because other harmful acts might come out of it. For example, although chemotherapy has many well-known adverse effects, oncologists still use it to fight certain types of cancer. In Islam, as long as the potential benefits outweigh potential harms, although I am not suggesting that this is true in the case of cloning, one can proceed with the work intended. If the work intended would be used responsibly without degrading humans, there would be no objection to its use. This argument is not legitimate since, as stated earlier, cloning will not be used on such a large scale to produce such an effect.

7. Scarce resource diversion:

This argument proposes that cloning would divert resources away from other more important social and medical needs. Opponents argue that it is unethical to divert scarce resources from more pressing social and medical needs (Brock, 1998). They argue that the nation's scarce resources should fund projects

that are likely to benefit the common good. Cloning, they say, might only benefit infertile couples. The first issue in considering "cost" involves the question of justice. If reproductive cloning ever becomes an option, how will its use be allocated? Obviously cloning technology will be quite expensive. In a world of scarce resources, allocation likely will occur either on a market basis in which one has access to what one can pay for, or on some type of rationing system. Although it does not seem likely that reproductive cloning ever would occur on a huge scale, we at least must consider the possibility that it might.

If cloning in such a system were based on ability to pay, society would face some very difficult issues regarding which people would have the privilege of being cloned. As discussed earlier, the right to pursue therapy for infertility in Islam is sanctioned since this condition is considered a disease. Although cloning would only serve a small group of the population, it does not mean that this small proportion of the population should be deprived of that method of treatment once its efficacy is proven.

If a rationing system is applied, and the application of cloning into a health care system would lead to the deprivation of other sectors in that system, problems would certainly appear. It would be unfair to divert these scarce resources to a field which would only benefit infertile couples, most likely only those with power and money. This concern is particularly significant in certain parts of the world where the government cannot meet the basic health needs of the population. The diversion of valuable resources to benefit a small proportion of people would go against the principle of justice. In such a case, the payment method would be best.

According to Islam, although the effort to treat is encouraged, the deprivation of other parts of society to benefit a small proportion of the population is not (IOMS, 1999). Certainly, all over the world there are more pressing human needs that have not been met. These needs range from the medical to the social and individual. Therefore, the diversion of public funds to cloning when they could be used to achieve other, more pressing ends cannot be justified. However, the same cannot be said about private funding. If infertile

couples can afford to use their own private funds to achieve cloning, this argument of opposition would lose its strength.

8.The deletion of the father's role:

Another Islamic argument against cloning is that if cloning were feasible from female to female, without a need for a male, many complications would arise. Taking a cell from the body of a female and extracting its nucleus in order to merge it with a female's egg would do this. The egg is transferred to a woman's womb after it is merged with the cell's nucleus, to grow and become a fetus and then a baby, which is a duplicate of the adult female. The children who are born out of cloned females, without a male, have no fathers (IOMS, 1999). This will lead to the loss of that human according to Islamic teachings. In addition to the loss of half the parental relationship, the role of the males in reproduction, as humans have known it since the creation of Adam, will be annihilated. Men will have no role to play and women will have all the power in the world over reproduction. This will eventually negatively affect development and civilizations.

The ratio of males to females is roughly equal now. Since in cloning, the clone follows the sex of its origin, the balance of the sex ratio will be disrupted. Although I agree with the first half of the argument in that a child with a single or no parent would suffer a great loss, I argue against the point that cloning would cause an imbalance in the future because I do not believe cloning would be used on such a large scale as to totally disrupt nature.

Misconceptions:

1. Cloning talented individuals:

Some proponents of cloning argue that cloning would enable the duplication of individuals of great talent, genius, character, or other exemplary qualities (Brock, 1998). Some talents seem to be genetically influenced, for

example, musical ability seems to run in families. Cloning, using the DNA from the cell of an adult with the desired traits or talents, might produce an infant with similar potential. However the fear that cloning could be used for these purposes is ungrounded. People are confusing genetic identity with personal identity (Evers, 1999). By subscribing to genetic determinism, we are saying that genes are sufficient to make us who we are. However, identical and conjoined twins are illustrative of the implausibility of this view. Both twins originate from the same zygote and so are genetically identical. However, each twin is a different person with a different personality. Furthermore, environmental influences play a huge role in making us who we are. Every choice we make causes our life path to branch out in different ways making an impact on our identity (Brock, 2002). Mr. Mohamed Yateem agrees by arguing:

> Humans are not the product of their genetic make up alone. The principle that our genes determine our behavior, psychology, intelligence, as well as our human nature, does not make sense scientifically. Studies have proven that our individuality is also shaped by our social and cultural exposure (IOMS. 1999. P.23)

The naivety of genetic determinism is emphasized by the fact that genetic identity does not constitute biological identity. Even cloned cells with identical sets of genes vary somewhat in shape and coloration. The variations are so subtle they can usually be ignored. However, when cells are combined to form organisms, the differences become marked and individuality is born. Two genetically identical individuals will unfold in slightly different ways.

Genetic identity is not personal identity. My individuality is the result of having a unique consciousness with a unique personal history, shaped not only by genetic inheritance but also by environmental, social and biological factors.

2. Genetic diversity and identity:

Opponents of cloning are concerned with the possibility that cloning used on a large scale could lead to a decline in genetic diversity, which would reduce

our capacity to adapt to new conditions (Brock, 1998). Their concerns stem from the question: If everyone has the same genetic material, what happens if we lose the ability to clone? Such an effect is only plausible if there are millions of clones of one person – which is extremely unlikely. With cloning there might only be a slight increase in the number of identical twins and triplets, thus the risk of raging epidemics is no more likely than it is at present. This fear is misplaced.

3. Immortality:

Perhaps one of the weakest arguments made against cloning is that it could be seen by those who seek immortality as an extension of their lives. By ensuring that a copy of them will always live, they achieve a state of immortality. This opinion suggests that since the genetic blueprint of one individual is used to make another individual with the same genetic make-up, the new individual will be an exact copy of the original; and an exact copy is as good as the original (McCarthy, 1999). If the process is continued time after time, the "dead" person will have achieved immortality (Klotzko, 1998). They argue that the desire for immortality is a built-in impulse in humans, made evident by the way the ancient Egyptians preserved their dead as mummies in the hope that they will live again.

It has been established that genetic identity does not constitute personal or even biological identity. It is impossible to completely re-create any human being, even physiologically. Thus, the new child produced by cloning would not be a carbon copy of the first child, and cloning does not provide the sort of immortality that we might want. The most important feature of wanting to live forever is wanting to experience the future of that immortal life in the same direct way that one experiences the present. There must be a strong psychological continuity between the person that died and the clone that is resurrected, to the extent that the new stream of consciousness would be the continuation of the stream before the death of the old one. However, the person's stream of consciousness will cease when they die. The clone's will start when she is born. The clone's stream of consciousness will be only her own.

Conclusion:

Human cloning has raised numerous ethical controversies. The ethical debate on human cloning has been complicated by sensationalistic media reporting (Hopkins, 1998). The public is not properly aware of the biological and ethical issues involved. The existence of a clone sends shivers down the spine of many individuals. Most of the arguments made about cloning in the ethical arena can be refuted easily, except for those concerned with using cloning as a reproductive method, once the principles of cloning have been understood. Most of the arguments against cloning were built on misconceptions regarding this new technology. However, the more one learns about cloning, the more one recognizes that a clone is nothing unusual. Cloning is not the creation of new life from basic organic and non-organic matter. Creation of life de novo is the prerogative of God alone. Although some Muslim thinkers have used some of these same arguments, I believe that Islam makes two of the strongest arguments against the cloning of an adult human, namely because of the breakdown of the family unity and the harms that can be brought to a child once a genetic linkage to both his or her parents is lost.

At the heart of the discussion, Muslims have raised questions about manipulation of human embryos in terms of their impact upon the fundamental relationship between man and woman and the life-giving aspects of spousal relations that culminate in parental love and concern for their off-spring. The Muslim debate on genetic replication is concerned primarily with moral issues related to the possibility of technologically created relationships. There is no spiritual or moral connection between a man and a woman in such embryonic manipulation. Can human advancement in biotechnically created relationships jeopardize the very foundation of human community, namely, a religiously and morally regulated spousal and parent-child relationship under the laws of God? Muslims raise precisely this concern in their rejection of human reproductive cloning.

Although there is no direct reference in the Holy Quran or any Hadith that expresses an opinion about cloning, there are plenty of verses that emphasize the crucial role of the family in society. After understanding the importance of a genetic lineage between the parents and their offspring, it can be seen why embryonic cell splitting could only be accepted as an assisted reproductive technology aiding only infertile couples bound by marriage.

To Muslims, the role of religion in determining right and wrong cannot be ignored. The words of God and the teachings of the Prophet that constitute these rules make Muslim societies better places to live. They protect the rights of each and every individual in it, including children. Cell mass division, or artificial twinning to use a simple term, causes no clashes with the basic laws of Islam as long as the procedure is carried out within the bond of marriage. In fact, the rules and regulations suggested to govern it are exactly the same as those discussed earlier for IVF. However, to clone an adult human using a nuclear transfer has many negative consequences from an Islamic perspective that cannot be undermined or ignored. If the relationships of family members were undermined, many of the Share'a rules could not be applied; the simplest example used here was inheritance. To say that cloning is categorically unacceptable would not be accurate. Helping people to over come their infertility brings with it countless benefits. However, to let cloning as a technology destroy the things that bring meaning and value to life in Muslim societies would be disastrous.

Chapter Four: Conclusion: Islam and Bioethics

Introduction:

Studying bioethics from a Western philosophical perspective made me grow curious about the ethics of Islam regarding many issues. While preparing my thesis I was amazed at the lack of English publications analyzing Islamic ethics. I decided to strive for a better understanding of the ethics of Islam because, besides practicing in a country where Islam is the leading religion, I thought I would benefit my colleagues in the Western world by helping them better understand the ethics of Islam. I have chosen to address IVF and human reproductive cloning in this thesis, but there are many other topics which still need to be explored and analyzed. I hope to address many of these topics in future publications. The aim of this thesis was to study and analyze the ethics of Islam regarding IVF and human reproductive cloning from the point of view of Sunni Muslims.

Islam as a religion is concerned with every aspect of human life. The primary sources of its rulings are the Quran and Sunnah. These two sources play a crucial role in every Muslim's life and are both considered sacred. Belief in both is essential and there is no doubt in any Muslim's heart or mind about the authenticity of the Quran or the Sunnah. The other sources (Ijma and Qiyas) are considered dependant sources because they rely upon the Quran and the Sunnah. These four sources are what Islamic scholars use today to reach their decisions. Actions are considered proper or right only if they conform to the broad teachings of the Quran and the Sunnah. They are improper or wrong if they are in conflict with these teachings.

Understanding that the way of Islamic thinking differs from what the Western world is accustomed to, especially from a religious ethical perspective, did not make my task any easier. Perhaps what must be emphasized again here is that Islam is not merely a religious theology but a practical guide to our everyday actions and social relations. The Holy Quran and the Sunnah of the Prophet are the primary sources of these guidelines. Islam is a very homogenous religion, and

although there may be disagreement regarding some issues which do not concern the topics of this thesis, there is a widespread consensus concerning the ethics of IVF and human reproductive cloning. In Islam, once an action is forbidden by either one of the sources referred to, no room is left for personal choice. Also, once a consensus is reached among the scholars, their ruling applies to all Muslims, wherever they live. Those who decide to proceed with a prohibited method of IVF for example, may do so but they will be stepping outside the boundaries of Islam and disobeying God.

Islam may be the most misunderstood religion within the Western world. The many misconceptions are due, at least in part, to the lack of publications clarifying certain issues. Most of the publications that exist are in Arabic. Once a new technology is announced, it cannot be rejected or accepted until it is properly understood. This is why it takes a long period of time from the announcement of a new technology to the publication of an Islamic ruling. Conferences have to be held between Islamic scholars and the experts in the new technology to explain and clarify any misunderstandings and answer any questions that might arise in the minds of the scholars (Islam, 1988). Only then can reference be made to the sources of Islam to reach a proper decision. The main concern is whether the new technology being introduced interferes with the ways of God (IOMS, 1999).

IVF and Islam:

Reproductive technologies, though different from the usual process of reproduction, are not rejected on this basis. Infertility in Islam is viewed as a disease, which Muslims are urged to treat, based on the teachings of the prophet but only within the limits of the Quran and the Sunnah (IOMS, 1983). Reproduction can only take place within the bonds of marriage and children should be born within that contract. Marriage is the only recognized form of union between a man and a woman (Rauf, 1996). Marriage is held in very high regard in Islam. Through it the family unit is born. Single parenting or any relationship between a man and a woman outside marriage is completely rejected by all

Muslims (IOMS, 1999). The family is the building block of Muslim societies and through them Muslim children receive the love and guidance they need. The role of the family does not end once the child enters into adulthood. The understanding of human development is quite different from dominant models in the Western world. Family patterns in Islamic societies continue to exist in many different ways with the integration of the parents and even grandparents in a close social network. Even Muslims living in the Western part of the world commonly expect their offspring to continue to live with them when they are adults. This is not an unusual act in the Muslim world and is not restricted to females. In certain situations, even once the children are married and have an independent life, either or both of the parents of either couple may continue to live with their children who provide and care for them.

Within the bond of marriage, the man and the woman pass their genetic material to their children, each giving exactly half of the total number of chromosomes. In certain practices of IVF, namely the use of donor sperm, ova, and surrogacy, the genetic material may be foreign to the parties involved in marriage. This form of practice is regarded as wrong because of the introduction of foreign genetic material between the married couple leading to the loss of the lineage between the parents and the children (Moududi, 1996). The protection of the genetic linkage of the child to its parents is the crucial reason Islamic ethics reject certain types of IVF and cloning. This is not only because they lead to the loss of legitimate lineage, but also because it leads to the adoption of a child by a father who is not the biological parent. Legal adoption is not allowed in Islam as it is practiced in West societies. By giving one's name to a child, they are given a right to inheritance that disrupts the interfamily relations. This practice is completely rejected in Islam. For a child to be given the name of that father, he must carry his genetic material; he must be related to him not only legally but genetically as well. It goes without saying that the benefits of IVF have been proven and are carried out routinely in many societies. Yet, notwithstanding the technological success of IVF, Muslims still reject the practice when the husband and wife do not provide the sperm and the egg (IOMS, 1983). Although it is true

that the pain of infertility is agonizing and the longing for children cannot be denied, Muslims believe that limits must be set to enable them to live within the boundaries of what God requires. Not all that can be done must be done if the consequences are known to transgress this principle. In Islam, these technologies are known and rejected because their consequences are understood to include the destruction of the family, the production of children outside the boundaries of a marriage, and the breaking of the genetic relationship between parents and their children. The introduction of a third party between a man and his wife cannot be accepted no matter how small a role was played in the creation of that child through sperm donation, embryo donation, or surrogate motherhood. Within Islam, a person cannot have more than one mother and she must be the one who gave birth to that child, according to the teachings of the Quran. Distinctions between genetic, intending, and birth parents do not exist in Islam. The genetic material can only come from the man and wife through a valid marriage contract without the introduction of any external material even if the intention is to relieve the burdens of infertility.

Human reproductive cloning and Islam:

Cloning, like every other case of technological advancement, has the potential to be used for the benefit of humans in general, as well as for their suffering. Cloning, per se, cannot straightforwardly be termed "good" or "bad". The decision, as should be clear after our deliberations, involves judging the socio-moral implications of particular usages of cloning. If a particular usage is considered to entail negative socio-moral implications, it should then be considered unethical, while if a particular usage does not entail any negative socio-moral implications and has the potential of benefiting humankind in general, it should then be considered ethical.

Islam teaches that God is the supreme Creator of All, the entire Universe, the life of all beings, and every law governing creation. Humans, on the other hand, do not invent or create anything on their own, though they can make

discoveries. According to Islamic thought, they discover what has already existed since the beginning of Creation. Islam encourages such scientific curiosity, considering it an integral part of the faith. Take cloning, as the controversial case in point. It is a process of humans discovering the biological characteristics of cells, and the previously undiscovered ability of these cells to reproduce themselves in ways other than the ones with which we are all familiar. Thus, according to Islam, cloning falls within God's natural laws. It has simply taken humans all these years to begin unlocking its mysteries. From an Islamic perspective, cloning is like any other discovery that can be regarded as a positive or negative achievement. It all depends on how this new knowledge is applied and what safeguards can be established against its potential misuse.

Although the technical procedure of cloning does not challenge God as the Creator of our universe and all that is within it, Muslims reject the practice of cloning on ethical grounds. Even if most of the arguments against cloning stem from misconceptions, and even if the potential of its misuse is minimized, the most powerful arguments against cloning are similar to those against IVF. The introduction of foreign genetic material into any marriage is refused in Islam for the same reasons previously examined.

Islam and Western Philosophical Bioethics principles:

Perhaps at the end of this thesis, a better understanding of Islam has been achieved, particularly the methods of analysis used to reach certain decisions within the boundaries of Islam. Western Philosophical bioethics commonly appeals to four major principles: autonomy, beneficence, non-maleficence, and justice. At first glance, one might think that Islam does not consider these principles. This would be a grave misunderstanding of what I have tried to present in this paper. Human life is very precious in Islam, and autonomy and freedom of choice carry great weight. However, for Muslims ethical reasoning is understood to take place within the boundaries set by the Quran and the Sunnah. Beneficence and non-maleficence are two major points which Islamic scholars consider when

reaching any decision. If a practice carries benefit to humans it is very much encouraged. However, if there are great potential harms then the practice is rejected. Finally, justice is always an issue within Islam. In Islamic ethics, the teachings of God and the Prophet always come first. The rules set by God in the Holy Quran are not to be altered or ignored. I believe that the analyses and explanations of the preceding chapters provide insight into the arguments made by Muslims concerning the rejection or acceptance of certain practices of IVF and cloning. The conclusions reached by Muslims are intelligible once the guidelines and interpretive framework of Islam are understood.

References:

1. Abdalati H. (1996). Islam in Focus - Islamic Book Service publication.
2. Al-Alawi Taha J. (1990). Usul Al Fiqh Al-Islami: source methodology in Islamic Jurisprudence. The international institute of Islamic thought. First edition.
3. Al-Batlayoosee Ibn Al-Sayyid (1982). Warning on the causes which make for disagreement among Muslims. Dar-al-Murrikh.
4. Albukhari Mohammed (1977). Translation of Sahih Albukhari. Dar-ul-Salam Publications.
5. Al-Hilali Mohammad Taqi-ud-Din, Khan Mohammad Muhsin (1985). Interpretation of the meanings of the noble Quran in the English language. Dar-us-Salam publications.
6. Ali Abdullah Yusuf (1940) The Holy Quran: Text, translation, and commentary. Two volumes Edition. Lahore (Pakistan). Publisher: Sheikh Muhammed Ashraf.
7. Allmers H. and Kenwright S. (1997). Ethics of cloning. Lancet 349 no. 9062 (May 10): 1401.
8. Alwari Taha J. F. (1998). The Ethics of Disagreement in Islam. The International Institute of Islamic Thought. Virginia.
9. American College of Obstetricians and Gynecologists (1990). Committee on Ethics. Ethical issues in surrogate motherhood. Washington, DC: American College of Obstetricians and Gynecologists.
10. Anderson E.S. (2000). Why Commercial Surrogate Motherhood Unethically Commodifies Women and Children: Reply to McLachlan and Swales. Health Care Analysis. March, Volume 8, no. 1, pp. 19-26(8).
11. Andrew, Lori B. (1999). The clone age: adventures in the new world of reproductive technology. New York: Henry Holt and company.
12. Arneson Richard J. (1992). Commodification and commercial surrogacy. Philosophy and public affairs 21, no. 2 (Spring).

13. Barnnigan, Michael C. (2001). Ethical issues in Human cloning: cross-disciplinary perspectives. New York: Seven Bridges Press.
14. Bello Ijsc A. E. J. Brill (1989). Islamic philosophy and theology: The medieval Islamic controversy between philosophy and orthodoxy. Leinden, New York: E. J. Brill.
15. Belt, Don (2002). The world of Islam. National Geographic Magazine, January.
16. Bigger R, and King T. J. (1952). Transplantation of living Nuclei from blastula cells into Enucleated Frogs' Eggs. Proceedings of the Natural Academy of Sciences of the United States of America. 38 (1): 455-63, 15 May.
17. Brinsden Peter R, Appleton Tim C., Murray Elizabeth, Hussein Mohamed, Akagbosu Fidlis, Marcus Samuel F. (2000). Treatment by in vitro fertilization with surrogacy: experience of one British center. British Medical Journal; 320:924-929 (1 April).
18. British Medical Association (1990). Surrogacy: ethical considerations. Report of the working party on human infertility services. London: BMA Publications.
19. Brock Dan W (2002). Human cloning and our sense of self. Science 296 (5566): 314-16, 12 April 2002.
20. Brock Dan W. (1998). Cloning Human Beings: An assessment of the ethical issues Pro and Con. From John D Arras, Bonnie Steinbock. Ethical Issues in Modern medicine; Fifth edition.
21. Burley J. and Harris J. (1999). Human cloning and child welfare. Journal of Medical Ethics. 25: 108-113.
22. Carment Ira H. (1986). Cloning and the constitution: an inquiry into governmental policy-making and genetic experimentation. University of Wisconsin Press.
23. Chang M. C (1959). Fertilization of a rabbit ova in vitro. Nature, 184: 466-467.

24. Chervenak F.A.; McCullough L.B.; Rosenwaks Z. (2001). Ethical Dimensions of the Number of Embryos to be Transferred in In Vitro Fertilization. Journal of Assisted Reproduction and Genetics, November, vol. 18, no. 11, pp. 583-587(5).
25. Cibelli J.B., Grant K.A., Chapman K.B., et al. (2002). Parthenogenetic stem cells in Nonhuman Primates. Science 295 (5556): 819, February.
26. Coulson N. J. (1999). A history of Islamic Law. Edinburgh at the University Press.
27. Cragg Kenneth (1973). The Mind of the Quran, George Allan & Unwin.
28. Crocklin Susan L. (1996). Family Building through Egg and Sperm Donation: "Medical, Legal and Ethical Issues". World Trade Press.
29. Davis Dena S. (2001). Genetic Dilemmas, reproductive technology, parental choices, and children's futures. New York: Rutledge.
30. Doi Abdur Rahman I. (2000). Marriage. Center for Islamic Legal Studies, Ahmad Bello University, Nigeria.
31. Dougherty CJ. (1992). The ethical case against surrogacy. Creighton Law Review, November; 25(5): 1585-8.
32. El-Alami Dawoud S., Hinchaliffe Doreen (1996). Islamic marriage, divorce laws of the Arab World. Kluwer Academic publishing.
33. Evers, Kathinka (1999). The identity of clones. Journal of Medicine and Philosophy. 24 (1): 67-76, February.
34. Fasouliotis S.J.; Schenker J.G. (2000). Ethics and assisted reproduction. European Journal of Obstetrics and Gynecology and Reproductive Biology. June; Volume 90, no. 2, pp. 171-180(10).
35. Fasouliotis SJ, Schenker JG (1999). A historical perspective of the clinical evolution of the assisted reproductive technologies. Gyn. Endocrin. Dec; 13(6): 420-40.
36. Fazlur Rahman (1979). Islam. Second edition, University of Chicago Press.

37. Gurdon J. B., Elsdale T. R., and Fischberg M. (1958). Sexually mature individuals of xenopus laevis from the transplantation of single somatic nuclei. Nature 182 (4627): 64-65, 5 July.

38. Gurdon J. B., Laskey R. A., and Reeves O. R. (1975) The developmental capacity of nuclei transplanted from keratinzed skin cells of adult frogs. Journal of Embryology and Experimental Morphology. 34 (1): 93-112, August.

39. Hacker Neville F, Moore J George, Schmitt William (1998). Essentials of Obstetrics and Gynecology. Third Edition. W. B. Saunders company.

40. Harris John (1997). Goodbye Dolly: the ethics of human cloning. Journal of Medical Ethics. December, 23: 353-360.

41. Harris John (1998). Cloning, Ethics and Immortality, Oxford University Press.

42. Hinman Lawrence M. (2002). Reproductive Technology and Surrogacy. An Introduction to the Issues. Available at: http://ethics.sandiego.edu/index.html.

43. Hopkins P. D. (1998). Bad copies. How popular media represent cloning as an ethical problem. Hastings-Cent-Report. March-April; 28(2): 6-13.

44. Illmensee K., and Hoppe P. C. (1981). Transplantation in musculus, Developmental potential of Nuclei from preimplantation embryos. Cell 23 (1): 9-18, January.

45. IOMS (1983). The Islamic organization for Medical Sciences series: Human reproduction in Islam. Volume One.

46. IOMS (1985). The Islamic organization for Medical Sciences series: Human life: the beginning and end from an Islamic perspective. Volume Two.

47. IOMS (1999). The Islamic organization for Medical Sciences Series: Cloning. Volume Nine.

48. Islam (1988). Sources and Purpose of knowledge. Islamization of knowledge series no. 5. Proceedings and selected papers of second

conference on Islamization of knowledge. The international institute of Islamic thought..
January.

49. Jenning JC, Moreland K, Peterson Cm (1996). In vitro fertilization. A review of drug therapy and clinical management. Drugs. Sep; 52(3): 313-43.
50. Jorgensen HK (2000). Paternalism, surrogacy, and exploitation. Kennedy Institute Ethics Journal. March; 10(1): 39-58.
51. Kamali M. Hashim (2000). Principles of Islamic Jurisprudence. Islamic texts society.
52. Kass Leon R. (1998). The Wisdom of repugnance. From John D Arras, Bonnie Steinbock. Ethical Issues in Modern medicine. Fifth edition. Mayfield
53. Kass Leon R., Wilson James Q. (1998). The ethics of human cloning. AEI press.
54. Kavic S, Cohen MA, Sauer MV, Lindheim SR. (2001). Controlled ovarian hyperstimulation. Relationship of early serum E2 level to the ultimate response of oocyte donors. Journal of reproductive Medicine. Jul; 46(7): 637-40.
55. Kenneth J. Ryan, Berkowitk Ross S., Barbieri Robert L., Dunail Andrew E. (1999). Kistner's Gynecology and woman's health. Seventh Edition. Mosby.
56. Ketchum Sara Ann (1989). Selling babies and selling bodies. Hypatia 4, number.3 (Fall): 116-127.
57. Khurshid Ahmed (1974). Family life in Islam. Islamic foundation publication. Second edition.
58. Klotzko Arlene Judith (1998). Voices from Roslin: The Creators of Dolly Discuss Science, Ethics, and Social Responsibility. Cambridge Quarterly of Healthcare Ethics. Volume 7, Issue 02. April. pp. 121-140.
59. Klotzko Arlene Judith (2001). Human Genetics Advisory Commission and Human Fertilization and Embryology Authority. Cloning Issues in

reproduction, Science, and Medicine: A report by a joint working group of the United Kingdom Human Genetic Advisory Commission and the Human Fertilization and Embryology Authority. The Cloning Sourcebook Edition. pp. 293-316. New York. Oxford University Press.

60. Krimmel Herbert T. (1983). The case against surrogate parenting. Hasting Center Report. October.
61. Lieber KB. (1992). Selling the womb: can the feminist critique of surrogacy be answered? Indiana Law Journal. winter; 68(1): 205-32.
62. Lindemann Nelson Hilde, Lindemann Nelson James (1992). Cutting motherhood in two: some suspicions concerning surrogacy. In: Holmes Helen Bequaert, Purdy Laura (Eds.): Feminist perspectives in medical ethics. New York: Hypatia Inc.
63. Ludwig M, Al-Hasani S, Felberbaum R, Diedrich K. (1999). New aspects of cryopreservation of oocytes and embryos in assisted reproduction and future perspectives. Human reproduction. Sep; 14 supp 1: 162-85.
64. Maududi Sayyid Abu Al-'Ala (1984). Islam: Its Meaning and Message. American Trust Publications, Indianapolis, Indiana.
65. McCarthy D. (1999). Persons and their copies. Journal of Medical Ethics 25: 98-104.
66. McGee Glenn (2000). The Perfect Baby: Parenthood in the New World of Cloning and Genetics. Rowman and Littlefield Publications.
67. McGrath J., and Solter D. (1983). Nuclear transplantation in the Mouse embryo by microsurgery and cell fusion. Science 220 (4603): 1300-1302, 17 June.
68. McGrath J., and Solter D. (1984). Inability of Mouse blastomere nuclei transferred to enucleated zygotes to support development in Vitro. Science 226 (4680): 1317-19, 14 December.
69. McLachlan H.V.; Swales J.K. (2000). Babies, Child Bearers and Commodification: Anderson, Brazier et al., and the Political Economy of Commercial Surrogate Motherhood. Health Care Analysis, March, volume 8, no. 1, pp. 1-18(18).

70. McWhinnie A. (2001). Gamete donation and anonymity: should offspring from donated gametes continue to be denied knowledge of their origin and antecedents? Human Reproduction. May; 16(5): 807-17. Review.
71. Morgan D. (1994). A surrogacy issue: who is the other mother? International Journal of Law Family. December; 8(3): 386-412.
72. Moududi A. (1996). Towards Understanding Islam. The Islamic foundation publication. 6th Edition.
73. Muhsin Ebrahim A. (2001). Organ transplantation, cloning, and animal experimentation: an Islamic view. Leicester. United Kingdom. The Islamic foundation.
74. Muir William (1894). Life of Mohamed. Third Edition. Great Britain. Smith, Elder and Company.
75. Muslim Al-Qushayri (1971). Translation of Sahih Muslim. Dar-ul-Salam publications.
76. NBAC (1997). National Bioethics Advisory Commission: Cloning Human Beings: Report and Recommendations. MD. National Bioethics Advisory Commission. June 9.
77. Niekerk A van and Zyl L van (1995). The ethics of surrogacy: women's reproductive labor. Journal of Medical Ethics. 21: 345-349.
78. Oakley J. (1992). Altruistic surrogacy and informed consent. Bioethics. October; 6(4): 269-87.
79. Overall Christine (1987). Ethics of human reproduction. Boston: Allen and Unwin.
80. Page E. (1985). Donation, surrogacy and adoption. Journal of Applied Philosophy. 2(2):161-71.
81. Pence George E. (1998). Who's Afraid of Human Cloning? Rowman and Littlefield.
82. Rachels James (1999). The Elements of Moral Philosophy. Third edition. McGraw-Hill.
83. Rauf Mohammad A. (1996). Marriage in Islam. Al-Saadowi Publishers.

84. Robertson J. A. (1998). Liberty, Identity, and human cloning. Texas law review 76, no.6: special issue on cloning. Cambridge Quarterly of Healthcare Ethics 7, no. 2 (spring): 115ff.
85. Rothman BK. (1992). Reproductive technologies and surrogacy: a feminist perspective. Creighton Law Review. November; 25(5): 1599-607.
86. Sachedina Abdulaziz. Cloning in the Quran and Tradition (Islamic Perspectives on Human Cloning). University of Virginia. Available at: http://www.people.virginia.ed/~aas/isislam.html
87. Seibel Michelle M. and Crocklin Susan (1996). Family building through egg and sperm donation: medical, legal, and ethical issues. Sudbury, MA: Jones and Bartlett.
88. Shanely Mary L. (2001). Making babies, making families: what matters most in an age of reproductive technologies, surrogacy, adoption, and same sex. Beacon press.
89. Silver L M. (2001). What are clones? Nature. Jul 5; 412 (6842): 21
90. Silver Lee. Remarking Eden (1997): Cloning and Beyond in a brave new world. Avon Books.
91. Staticstics Canada (1991). Available at: http://www.statcan.ca/english/pgdb/demo32.htm
92. Steptoe P, Edwards R (1978) Birth after reimplantation of a human embryo. Lancet, 2: 366.
93. Von Denffer Ahmed (1994). Ulum Al-Quran. Islamic Foundation.
94. Wakayama T., Perry A.C.F., Zuccotti M, Johnson K.R., Yamagimachi R. (1998). Full-term development of mice from enucleated oocytes injected with Cumulus cell nuclei Nature 394 (6691): 369-74, 23 July.
95. Willadsen S. M. (1986). Nuclear transplantation in sheep embryos. Nature 320 (6057): 63-65, 6-12 March.
96. Wilmut I, Schnieke A.E., McWhir J, King A.J, and Campbell K.H.S. (1997). Viable offspring derived from fetal and adult mammalian cells. Nature 385 (6619): 810-13, 27 February.

97. Wilmut Ian, Campbell Keith, Tudge Colin (2001). The second creation: Dolly and the age of biological control. Farrar Straus & Girux. July.