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Cryopreserved Embryos: A Catholic Alternative to Embryonic Stem Cell Research and Adoption

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1. Introduction

It is estimated that 2.1 million married couples or 5 million people in the United States are affected by infertility.¹ Infertility is defined as failure to get pregnant after one year of unprotected intercourse. About 40% of infertility cases are due to a female factor and 40% due to a male factor. The remaining 20% are the result of a combination of male and female factors, or are of unknown causes.² Issues of human infertility are extremely complex physiologically, psychologically, financially, legally and ethically. It is estimated that 85-90% of infertile couples will receive conventional treatment and 10-15% may become candidates for various forms of Assisted Reproductive Technologies (ARTs) to assist them in having their own biological children. In-vitro fertilization (IVF) is one of the most utilized reproductive procedures that has allowed couples to have their own biological children. IVF accounts for 99% of ART. This procedure has been effective but it is still inefficient and expensive. One aspect of the inefficiency is that numerous embryos have been frozen through a process called cryopreservation. It has been estimated that there are 400,000 embryos frozen and stored since the late 1970s.³ In reality, the actual number of frozen embryos is probably closer to 500,000 with an additional 20,000 embryos added yearly.⁴ Freezing these embryos has allowed for a limitation on the number of embryos transferred to a woman's uterus which has decreased the number of multiple gestations. It also allows couples to use the frozen embryos in the future if the initial cycles are unsuccessful. This is not only more effective but also lowers the cost. The issue is now what to do with the 400,000 to 500,000 frozen embryos that remain as "spares." Various alternatives have been suggested. The embryos could be thawed and then destroyed, continued to be cryopreserved indefinitely, used for research, or offered for donation/adoption. All of these options present problems medically, legally and ethically, especially for Roman Catholics. Medically, the lifespan of a cryopreserved embryo is unknown. The effect of the freezing process is also unknown on the quality of the embryo if brought to term. "Studies have found that babies created through IVF are twice as likely to be born underweight and with major birth defects."⁵ With the unknown effects of cryopreservation on embryo development the medical issues become even more complex. Legally, only 2% of frozen embryos are specifically designated for donation/adoption and 5% are specifically designated for destruction or research.⁶ The legal issues focus on the applicability of contract law versus family law because frozen embryos are technically considered "property" not

“persons.” Presently, the applicability of contract law or family law remains unclear. In addition, to date only three states – Florida, Louisiana and New Hampshire – have adopted legislation concerning the disposition or disposal of embryos. Legally and legislatively the issue of embryo donation/adoption is ambiguous at best. Ethically, depending on one’s view of when personhood begins, frozen embryos may be considered human persons, which deserve dignity and respect, or they may have less than human status with no particular ethical rights. From an ethical perspective that views personhood beginning at fertilization, one could argue that the “rescue” of these embryos could be considered ethically acceptable. The problem is that in 2008 the Vatican’s Congregation for the Doctrine of the Faith issued an Instruction called *Dignitas Personae*, which stated that prenatal adoption, “praiseworthy with regard to intention of respecting and defining human life, presents however various problems” and is considered unethical.⁷ If donation/adoption is not acceptable by the Magisterium then the only remaining option would be to stop the process of cryopreservation and allow the thawed embryos to die with dignity and respect under the principle of the extraordinary/ordinary means distinction.

This article will focus on allowing to die under the principle of extraordinary/ordinary means distinction as a viable option to address the 400,000 to 500,000 frozen embryos in the United States. The intended purpose of this article is threefold: first, to examine the medical issues surrounding the cryopreservation of frozen embryos; second, to give an ethical analysis of the arguments for and against allowing to die; and third, to give recommendations on how to avoid the continuation of this problem in the future.

2. Medical aspects

Infertility is a major problem for many couples in the United States. “About one married couple in 12 cannot conceive a child after two years of trying. Infertility stems from many factors, including a woman’s age at the first attempt to conceive, damage from pelvic inflammatory disease, previous abortions, uterine abnormalities, and a man’s low sperm count or low sperm motility.”⁸ Individually, male and female factors each account for about 40% of infertility in the United States. Numerous technologies are available to couples from artificial insemination by a husband or a donor, to gamete intrafallopian transfer (GIFT), to zygote intrafallopian transfer (ZIFT), to in-vitro fertilization. Of these reproductive technologies IVF has become the ART of choice for many infertile couples. IVF is an assisted reproductive technology which had its first success in 1978 when Drs. Edwards and Steptoe in Oldham, England created the first “test tube baby” named Louise Brown. Since that first success, IVF technology has been refined and over 3 million babies have been born worldwide.⁹

There are five basic steps to IVF. 1) *Harvesting the eggs from the woman’s ovaries.* The woman’s ovaries are hyperstimulated using fertility drugs that produce numerous eggs. During this period the woman will have regular transvaginal ultrasounds to examine the ovaries and blood tests to check hormone levels. 2) *Egg retrieval.* The eggs are removed from the woman’s body using follicular aspiration. Using ultrasound images as a guide the physician inserts a thin needle through the vagina and into the ovary and sacs containing the eggs. The needle is connected to a suction device, which pulls the eggs and fluid out of each follicle, one at a time. In rare cases, a pelvic laparoscopy may be used to remove the eggs. 3) *Insemination and Fertilization.* The man’s sperm is placed with the best quality eggs in a petri

dish and stored in an environmentally controlled chamber. The mixing of the sperm and egg is called insemination. The sperm usually enters an egg a few hours after insemination. If there is a low chance for fertilization, one single sperm can be injected into an egg in a procedure called Intracytoplasmic Sperm Injection (ICSI). 4) *Embryo culture*. The fertilized eggs remain in the petri dish for 48 to 72 hours to verify that the embryo is not defective and growing properly. If a couple is at high-risk for passing on genetic (hereditary) disorders to a child they may consider using Pre-implantation Genetic Diagnosis (PGD). The procedure is performed 3-4 days after fertilization. A single cell is removed from each embryo to screen it for specific genetic disorders. Those embryos with the genetic disorder are usually destroyed. 5) *Embryo transfer*. Anywhere from 1-4 embryos are placed in the woman's womb 3 to 4 days after fertilization. The physician inserts a thin catheter containing the embryos into the woman's vagina, through the cervix, and up into the womb. If the embryo implants in the woman's uterine wall pregnancy will result.¹⁰

The implantation rate is estimated at 10-25%.¹¹ The overall birth rate varies from 11% (women over 40) to about 35% (women under 35).¹² This clearly shows that a number of embryos transferred fail to survive, which is why multiple embryos are transferred per cycle and why numerous cycles are required. On average, 2.7 embryos per cycle are transferred in women under 35, with an average of 3 in older women. Depending on the embryo quality, up to 5-6 embryos can be transferred.¹³ The average cost of IVF is \$12,000-17,000 per cycle. It is estimated that 75% of couples who have tried IVF and who spent from \$10,000-100,000 still go home without a baby.¹⁴ Risks include the possibility of ovarian hyperstimulation syndrome (OHSS), risks in the egg retrieval stage which include reactions to anesthesia, bleeding, infection and damage to structures surrounding the ovaries including the bowel and bladder, and finally there are the risks associated with multiple pregnancies. Since 1980 the rate of twins has climbed 70% to 3.2% of births in 2004. Multiple gestations raise the risk of preterm births; low-birth-weight babies, with the possibility of death in very premature infants; long-term health problems; and pregnancy complications, which include pre-eclampsia, gestational diabetes, and Caesarean section. Studies have shown that 56% of IVF twins born in 2004 weighed less than 5.5 pounds, and 65% were born prematurely, before 37 weeks of gestation.¹⁵ Embryos not transferred in a fresh IVF cycle are usually cryopreserved. Freezing these embryos offers individuals the possibility of transferring the frozen embryos for later IVF cycles if the previous cycle does not result in a pregnancy. It is also cost effective and eliminates the need to undergo the steps needed for a fresh IVF cycle. In most cases the best quality embryos are transferred in the fresh cycle and those of a lesser quality are frozen for later transfer. It should be noted that some clinics have individual freezing and thawing to achieve the exact number of embryos desired for transfer. This procedure avoids embryo wastage.

The process of cryopreservation has become an integral part of the IVF procedure. "Cryopreservation is a process of freezing biological tissues for storage, while minimizing cellular damage from freezing and thawing."¹⁶ This technique entails freezing the embryo while simultaneously removing the intracellular water and replacing it with a cryoprotectant solution which help to protect the embryo during the freezing process. The embryos are then placed into cryopreservation straws or vials, which are labeled with the patient's name, the patient's IVF number, and the date of the freeze. Once the process is complete, the embryos are placed in a computer controlled freezing unit. After the freezing run is complete, the straws are stored in a special tank filled with liquid nitrogen at a

temperature of minus 196 degrees centigrade.¹⁷ Many storage facilities use a back-up system to minimize the risk of interruption in the freezing process. Liquid nitrogen containers are armed with an automatic alarm system to monitor nitrogen levels and prevent premature thawing.¹⁸ These embryos are looked upon as being in a state of “suspended animation.” Cellular activity has ceased, but each embryo is still alive. When the remaining embryos are needed a procedure utilizing rapid thawing and removal of the cryopreservative solution with simultaneous rehydration is used. The embryos are first warmed in a 98.6 F degree solution and the cryoprotectant chemicals are removed.¹⁹

The embryo thawing process is quite complex. “Embryo survival is based on the number of viable cells in an embryo after thawing. An embryo has ‘survived’ if >50% of the cells are viable. An embryo is considered to ‘partially survive’ if <50% of its cells are viable and to be ‘atretic’ if all the cells are dead at thaw. Approximately, 65-70% of embryos survive thaw, 10% partially survive and 20-25% are atretic. Data suggests that embryos with 100% cell survival are almost as good as embryos never frozen but only about 30-35% survive this fashion. Embryos that are 2, 4 or 8 cells when frozen have about a 5-10% greater survival than embryos with an odd number of cells. Donor egg embryos have a 2-5% greater survival rate than embryos from infertile women when compared by morphology score”²⁰ The cost of cryopreservation is approximately \$600-700 a year. The success rate or pregnancy rate depends on numerous factors: the number of surviving embryos transferred, the number of 100% surviving embryos transferred, and the morphology scores of the transferred embryos. The delivered pregnancy rates range from 5% (a single poor quality embryo) to 36% (4 high quality embryos) when the cycles from 1987 to 2001 were combined. It is estimated that embryo cryopreservation adds about 10-30% more pregnancies per retrieval cycle and the outcomes of the children are normal.²¹ The reason for the wide range of costs and success rates is because the Assisted Reproductive Technologies industry in the United States is unregulated. The success rates and costs can vary from clinic to clinic and there is no government oversight examining the widespread differences.

The advantages of embryo freezing are numerous: reducing the risks of multiple gestations potentially increases pregnancy rates, decreasing the number of stimulated treatment cycles needed to achieve pregnancy, decreasing the costs of ARTs, etc. The main disadvantage according to the 2003 RAND/SART Working Group study centers on the approximately 400,000 frozen “spare” embryos stored since the 1970’s.²² More recent numbers have the number of frozen embryos in excess of 500,000. The 500,000 number seems more realistic considering the increase in IVF procedures since 2003. The issue that is confronting parents and fertility clinics is what to do with these “spare” embryos medically, legally and ethically.

The RAND/SART survey in 2003 found that of the 400,000 frozen spare embryos 88.2% were designated for family building and 2.8% (11,000) were designated for research. Those embryos designated for research could produce as many as 275 stem cell lines (cell cultures suitable for further development). However, the number would in reality be much lower. Of the remaining embryos, it is estimated that 2.3% (10,000) are awaiting donation, 2.2% are designated to be discarded, and 4.5% are held in storage for other reasons, including lost contact with a patient, patient death, abandonment, and divorce.²³ There are numerous issues concerning the “spare” frozen embryos. The ART clinics transfer the highest quality embryos (those that grow at a normal rate) to the patient during treatment cycles. The remaining embryos are usually designated as not of the highest quality. In addition, some of

the frozen embryos have been in storage for many years, and when these embryos were created the laboratory cultures were not as conducive to preserving embryos as they are today. Some embryos would also die in the freeze-thaw process. Considering all these issues, the question is how many embryos actually are available for research and donation/adoption? The RAND/SART team estimated that 65% of the approximately 11,000 embryos designated for research would survive the freeze-thaw process, resulting in 7,334 embryos. Of those, about 25% (1,834 embryos) would likely be able to survive the initial stages of development to the blastocyst stage (a blastocyst is an embryo that has developed for at least 5 days). Even fewer could be converted into embryonic stem cell lines. Their estimate is about 275 embryonic stem cell lines could be converted from the total number of embryos designated for research. The RAND/SART team also estimates that 2.3% of the 400,000 frozen "spare" embryos designated for donation/adoption, only 23,000-100,000 embryos could be adopted, thawed and successfully born.²⁴ Having this many children potentially available for adoption would help meet the need of couples seeking adoption in the United States. The problem is that the adoption process for frozen embryos is legally quite ambiguous and very complex. In addition, with the Magisterium of the Catholic Church issuing the Instruction *Dignitas Personae* it appears that donation/adoption is no longer acceptable for Catholics. The only viable option for these spare embryos would be to allow them to be thawed and to die with dignity and respect under the principle of extraordinary/ordinary. The central issue is whether this is an ethically sound viable solution for the Roman Catholic Church.

3. Ethical aspects

Ethically, the concern about spare embryos focuses on the issue of personhood. If embryos are persons then it would be a moral imperative to "rescue" these embryos from their current status of being in "frozen animation." Numerous ethicists, embryologists, legal professionals and specifically, the Roman Catholic Church, argue that personhood begins at conception or what is known as fertilization. Prior to fertilization we have two human gametes—sperm and egg, that are living but are not a living organism. When fertilization occurs, something human and living "in a different sense comes into being."²⁵ Embryologists argue that "human development begins at fertilization when a male gamete or sperm (spermatozoon) unites with a female gamete or oocyte (ovum) to form a single cell—zygote. This highly specialized, totipotent cell marked the beginning of each of us as a unique individual."²⁶ The Catholic Church teaches that "human life must be absolutely respected and protected from the moment of conception."²⁷ "Right from fertilization is begun the adventure of a human life, and each of its great capacities requires time . . . to find its place and to be in a position to act. This teaching remains valid and is further confirmed, if confirmation were needed, by recent findings of human biological science which recognize that in the zygote resulting from fertilization the biological identity of a new human individual is already constituted."²⁸ The Church argues that at fertilization there is a new genetic individual in its own right, one who is whole, bodily, self-organizing, and genetically distinct from his or her mother and father.²⁹ Those who argue that personhood begins at fertilization would also argue that there is a moral imperative to give these frozen embryos the opportunity to be born and to develop because they are persons. Ethicist Therese Lysaught believes that embryo donation/adoption is an act that can properly be

described as “rescuing a child orphaned before birth.”³⁰ Ethicists arguing for the “rescue” of these children would encourage women to implant these embryos in their wombs in order to bring them to term. Some would permit not only married women to do this but also single women and even lesbian couples. The moral principle of sanctity of human life would overcome any other moral considerations. However, not all, even in the Catholic Church, would agree to this ethical analysis. Opponents of this position argue that this would amount to material cooperation in an objective immoral action. Not only is the process of IVF considered an intrinsic moral evil by the Magisterium of the Catholic Church, but allowing for the donation/adoption of these embryos might condone the objective immoral procedure and may even encourage the creation of additional embryos through the IVF process. The Catholic Church clarified its position on embryo donation/adoption in 2008 in the Instruction from the Congregation of the Faith called *Dignitas Personae*. “The proposal that these embryos could be put at the disposal of infertile couples as a treatment for fertility is not ethically acceptable for the same reasons which make artificial heterologous procreation illicit as well as any form of surrogate motherhood; this practice would also lead to other problems of a medical, psychological and legal nature.”³¹ This statement by the Magisterium removes donation/adoption as a viable option for Catholics. The only remaining option would be to allow these embryos to die with dignity and respect using the extraordinary/ordinary means distinction. To determine if thawing these embryos and allowing them to die naturally is ethical and to address the ambiguities and unresolved issues surrounding this controversy, the traditional ethical principle of the extraordinary/ordinary means distinction will be examined and applied to this situation.

The history of the Catholic Church’s position on the ordinary-extraordinary means distinction dates back to the 16th century Dominican moralists. There are however, some who believe it may go back to Thomas Aquinas (1225-1274) a Dominican Friar and Doctor of the Roman Catholic Church. Thomas’ belief in the moral measure of all human activity is whether it leads to God, the final end. Thus, if something was “too difficult” or “too burdensome” what was implied was that it might make loving God too difficult.³² The general obligation to preserve life and the possible limits to that obligation are also influenced by Thomas’ concept of God’s dominion over the gift of human life, responsible stewardship and the positive and negative precepts derived from these.³³ Thomas’ influence is clearly present, but it is the three Dominican moralists--Francisco De Vitoria, Domingo Soto and Domingo Banez--who articulated the foundation of the ordinary-extraordinary means distinction.

De Vitoria (1486-1546) examined the limits of treatment in regards to nourishment and medicinal drugs. In his seminal work *Relectiones Theologicae* he states:

“If a sick man can take food or nourishment with a certain hope of life, he is required to take food as he would be required to give it to one who is sick. However, if the depression of spirits is so severe and there is present grave consternation in the appetitive power so that only with the greatest effort and as though through torture can the sick man take food, this is to be reckoned as an impossibility and therefore, he is excused, at least from mortal sin.”³⁴

De Vitoria is not condoning suicide here. A healthy person may not starve him-herself because life is problematic. If the means are effective and not burdensome then the person is morally obligated to seek nourishment. However, if the person is so sick or depressed that eating may become a grave burden, then the person is not morally obliged to eat and does

not commit a sin. The essential point here is that De Vitoria recognizes both psychological and physiological illness and his notion of grave burden includes both. In regards to medicinal drugs, he argues that they are not *per se* obligatory. The obligation to use them rested on the degree of efficacy. One is not obliged to sacrifice one's whole means of subsistence, nor one's general lifestyle, nor one's homeland in order to acquire a cure or obtain optimum health.³⁵ It appears that De Vitoria adopted the 16th century's version of the "Reasonable Person" criteria. "To fulfill one's positive obligation to sustain life, it is sufficient to perform 'that by which regularly a man can live.'"³⁶ The moral components that appear operative here are not natural as opposed to artificial means, but those means that offer a reasonable hope of benefit in regard to cure and return to health. Excessive burdens in terms of financial costs or inconvenience of lifestyle are measured by "the semi-objective standard of the common person regularly considered," or what we refer to as the "reasonable person standard."³⁷ If the means used to prolong life were ineffective, if the effect was doubtful, or if it involves a grave burden for the person in question, this means need not be morally obligatory.

Prior to the development of modern anesthesia, surgical procedures, especially amputations, were quite painful. Domingo Soto (1494-1560) reasoned that surgery such as amputation of a limb, because of the excessive pain, ought to be considered categorically optional. He argued that such torture was beyond the limits that the "common man" ought to be obliged to suffer for the sake of one's bodily health. Such surgery can make a beneficial surgery "morally impossible" to bear.³⁸ Besides the question of pain, Soto also recognizes the role that emotions of fear and repugnance could play.³⁹ Soto incorporates the dimension of optional versus obligatory, adding if a procedure or treatment was too painful or burdensome, it would be morally optional.

In 1595, Domingo Bañez (1528-1604) was the first to articulate the terms "ordinary" and "extraordinary" as they regard obligatory and non-obligatory means of preserving life. He argued that if preserving life was reasonable it was obligatory but insisted that one is "not bound to extraordinary means but to common food and clothing, to common medicines, to certain common and ordinary pain; not, however, to certain extraordinary and horrible pain, nor to expenses which are extraordinary in proportion to the status of this man."⁴⁰ One determined if a treatment or medical procedure was ordinary or extraordinary according to whether it was proportionate to one's condition or state in life. "Thus, if something were very costly or burdensome or if it did not offer substantial benefit to the patient, there was no moral obligation to use it. This standard applied to even life-saving measures."⁴¹ The Jesuit moralist Juan Cardinal De Lugo (1583-1660) confirms Bañez's position when he wrote, "...he is not held to the extraordinary and difficult means . . . the 'bonum' of his life is not of such great moment, however, that its conservation must be effected with extraordinary diligence. . ." ⁴² De Lugo's position, like that of the Dominican moralists, followed the tradition of the Church that states human life is a good but not an absolute good. As a relative good, one's duty to preserve it is a limited duty. While a person has freedom over his or her life, one is never permitted to directly take one's life. The issue becomes to what extent is one obligated to preserve one's life.

The traditional understanding of ordinary-extraordinary means remained basically unchallenged until the mid-1900s with the advent of advances in medicine and technology. How to apply the early distinction of ordinary-extraordinary means to issues like oxygen and feeding tubes, especially with permanently unconscious patients became hotly debated as early as the 1950s. Jesuit moralist Gerald Kelly was one of the first to examine this issue

critically. He defined ordinary means of preserving life as “all medicines, treatments, and operations, which offer a reasonable hope of benefit for the patient and which can be obtained and used without excessive expense, pain, or other inconvenience.” Extraordinary means would be “all medicines, treatments, and operations, which cannot be obtained or used without excessive expense, pain, or other inconvenience, or which, if used, would not offer a reasonable hope of benefit.”⁴³ The distinctive element of Kelly’s interpretation is that it is a patient-centered, quality-of-life approach which is consistent with how the 16th-century-Dominican moralists viewed this distinction. Kelly concludes that no person is morally obligated to use any means, and this would include natural or artificial means, that does not offer a reasonable hope of ameliorating the patient’s condition. To clarify this distinction, Kelly was asked if oxygen and intravenous feeding must be used to extend the life of a patient in a terminal coma. He replies: “I see no reason why even the most delicate professional standard should call for their [oxygen and intravenous for a patient in a terminal coma] use. In fact, it seems to me that, apart from very special circumstances, the artificial means not only need not but should not be used, once the coma is reasonably diagnosed as terminal. Their use creates expense and nervous strain without conferring any real benefit.”⁴⁴

Many believe that the most authoritative historical study on this topic was done by Daniel Cronin (who later became Archbishop of Hartford) in his 1958 doctoral dissertation at the Gregorian University in Rome entitled, “The Moral Law in Regard to the Ordinary and Extraordinary Means of Preserving Life.” After a review of over 50 moral theologians from Aquinas to those writing in the early 1950’s Cronin concludes that the Church’s teaching is consistent in its view: “Even natural means, such as taking of food and drink, can become optional if taking them requires great effort or if the hope of beneficial results (*spes salutis*) is not present.” For a patient whose condition is incurable, he writes, “even ordinary means, according to the general norm, have become extraordinary [morally dispensable] for the patient [so] the wishes of the patient, expressed or reasonably interpreted, must be obeyed.”⁴⁵ The importance of Cronin’s position is that no means—even food and water—can ever be classified as absolutely obligatory regardless of the patient’s condition. However, some moralists disputed this fact and claimed that food and water were absolutely ordinary and even tried to say that was what the tradition taught.

On November 24, 1957, in a talk delivered to the International Congress of Anesthesiologists, Pope Pius XII gave papal approbation to the ordinary-extraordinary means tradition that dates back to De Vitoria.

“Natural reason and Christian morals say that man (and whoever is entrusted with taking care of his fellow man) has the right and the duty in case of serious illness to take the necessary treatment for the preservation of life and health . . . But normally one is held to use only ordinary means—according to circumstances of persons, places, times and culture—that is to say, means that do not involve grave burden for oneself or another. A more strict obligation would be too burdensome for most men and would render the attainment of the higher, more important good too difficult. Life, health, and all temporal activities are in fact subordinated to spiritual ends. On the other hand, one is not forbidden to take more than the strictly necessary steps to preserve life and health, as long as he does not fail in some more serious duty.”⁴⁶

Pius XII upholds the traditional ordinary-extraordinary means distinction that “involves patient-centered judgments about the quality of life, which must take into account the usefulness of the treatment, one’s understanding about death and dying, and the

repugnance one may have toward one's life after subjection to a particular medical treatment."⁴⁷ It is also important to note that Pius XII emphasized the importance of viewing the person holistically. In an address given to the International Union Against Cancer, in 1956, Pius XII counseled that "before anything else, the doctor should consider the whole man, in the unity of his person, that is to say, not merely his physical condition but his psychological state as well as his spiritual and moral ideals and his place in history."⁴⁸ This statement reinforces the traditional understanding of not treating the physiological aspect of the body separate from the person. Benefits of a treatment can only be determined within the context of a person's life.⁴⁹ To preserve life at all cost is to risk idolatry and thus would lead a person away from the higher spiritual good which is eternal life.

A contemporary understanding of the ordinary-extraordinary means distinction was given in the 1980 Congregation for the Doctrine of the Faith's *Declaration on Euthanasia*. The Declaration follows the tradition on the ordinary-extraordinary means distinction since the 16th century, which is based on the effect of the treatment on the patient or those responsible for the care of the patient. The Declaration reminds us of the duty one has to care for one's own life and to seek such care for others. But there are limits to this obligation. One needs to judge the means used by "studying the type of treatment to be used, its degree of complexity or risk, its cost and the possibilities of using it, and comparing these elements with the result that can be expected, taking into account the state of the sick person and his or her physical and moral resources."⁵⁰ The Declaration goes on to give four examples: patients are permitted to use experimental, advanced medical techniques, which may be a service to humanity; patients may interrupt treatments if they fall short of expectations; the refusal of a technique that is in use and carries a risk or is burdensome is not equivalent to suicide; finally, when death is imminent in spite of the means used, it is permitted in conscience to make the decision to refuse forms of treatment that would only secure a precarious and burdensome prolongation of life, so long as the normal care due to the sick person in similar cases is not interrupted.⁵¹ Finally, the Congregation for the Doctrine of the Faith reflects the traditional teaching when it writes: "Life is a gift from God, and on the other hand death is unavoidable; it is necessary, therefore, that we, without in any way hastening the hour of death, should be able to accept it with full responsibility and dignity."⁵² The only real change is that the document realizes that the terms ordinary and extraordinary are imprecise as terms in regards to the rapid advancement of medicine and technology. More precise terms would be proportionate and disproportionate.⁵³

The historical review of the tradition shows a clear distinction between extraordinary and ordinary means that involves patient-centered judgments about the quality of life, which must take into account the usefulness of the treatment, one's understanding about death and dying, and the repugnance one may have toward one's life after subjection to a particular medical treatment.⁵⁴ The ethical issue concerning frozen embryos focuses on the foregoing of artificial life support from them, which would allow the embryos to die naturally. Some might argue that this is a form of euthanasia. Pope John Paul II in *Evangelium Vitae* states: "Euthanasia's terms of reference, therefore, are to be found in the intention of the will and in the methods used."⁵⁵ The intention here is not to end the life of the embryo but to forego a burdensome treatment and allow the embryo to die naturally with dignity and respect. The Pope himself states clearly that euthanasia must be distinguished from the decision to forego what he refers to as "aggressive medical treatment." "Medical procedures which no longer correspond to the real situation of the patient, either because they are by now disproportionate to any expected results or because they impose an excessive burden on the

patient and his family.⁵⁶ If the intentionality is to forego a non-beneficial treatment that the surrogate believes is disproportionate and not in the embryo's best interest, then the intentionality is to allow the person to die rather than not to terminate the person directly. These embryos will not be abandoned or discarded. Instead they will be cared for lovingly during the dying process and treated with the utmost dignity and respect.

The benefit of a medical procedure or treatment was traditionally viewed as a prudential judgment of the patient or surrogate on how a particular treatment or procedure would impact on the life of the patient. Benefits and burdens were never judged abstractly. "Not only the means (proposed intervention) but the ends toward which the intervention is aimed are important in moral analysis."⁵⁷ The fact that a particular means was able to sustain a human life did not make such a means beneficial to the person. Traditional moralists did not restrict benefits merely to sustaining life, but included broader, more holistic considerations. Improvements in one's condition, relief of pain and suffering, maximization of comfort, restoration of health, among others all were considered beneficial. For DeVitoria and other traditional moralists, the mere preservation of life and vital physiological functions was not sufficient in itself to oblige someone to use a certain means. The traditional understanding of ordinary-extraordinary means was based on treating the whole person, not one part of the person. Just because a treatment could prolong a life did not mean that a particular treatment was a benefit. Benefits must be considered worthwhile both in quality and duration. In the Catholic moral tradition, a medical treatment was beneficial if it restored a patient to a relative state of health. The frozen embryos will not be implanted into the womb of the biological mother. The options would be to stay frozen in a state of "permanent suspended animation," be used for stem cell research, be used for other forms of experimentation, or be placed for donation/adoption. The Magisterium of the Catholic Church has rejected all of these options as ethically acceptable. To allow these embryos to stay frozen indefinitely violates the basic dignity and respect of the person. Therefore, the only viable option for these frozen embryos would be to stop the process of cryopreservation and allow them to die naturally with dignity and respect. One could equate the process of cryopreservation to maintain the life of the embryo to the use of a mechanical ventilator to maintain the life of a terminal patient. To continue to keep the embryos alive through cryopreservation is a form of extraordinary means that is disproportionate and offers no reasonable hope of benefit for the embryo. Failure to receive a meaningful benefit from a treatment makes said treatment not morally obligatory. Allowing a person to die by foregoing aggressive, non-beneficial treatments is not only morally permissible, it is also treating the person with dignity and respect. Therefore, it is morally and ethically acceptable to allow these embryos to die naturally with dignity and respect under the principle of the extraordinary and ordinary means distinction. However, it is also imperative that safeguards be put in place that would eliminate creating more "spare" embryos in the future.

4. Conclusion & safeguards

Cryopreserved embryos are a complex issue that has medical, legal and ethical dimensions. Allowing these embryos to die naturally is the only viable option that protects and preserves their human dignity. The other viable options: being discarded, destroyed for research, abandoned or kept in "suspended animation" indefinitely, are unacceptable because they have the potential of harming or intentionally killing these embryos that deserve special respect.

To make sure that this situation does not continue in the future, the following recommendations and safeguards are proposed:

1. Only the number of eggs to be placed in the uterus of the mother will be fertilized. Embryos must not be subjected to an intentional interruption of their natural growth and development. There will no longer be “spare” embryos subjected to cryopreservation. Only cryopreservation of gametes would be acceptable.
2. Laws and legislation must be enacted at the federal level that begins to regulate Assisted Reproductive Technologies. Having each state governed by differing sets of legislation could cause potential complications associated with the practice of donation/adoption. How each state defines jurisdiction and how each state interprets at what stage jurisdiction would begin (conception, transfer, or birth) could become highly complex. Specifically, guidelines and safeguards must be put in place that protects donors, parents, providers, and children born of ART.
3. Laws and legislation must be enacted that regulates the creation, destruction and exploitation of human embryos. An example would be the following: legislation established in New Mexico stating that human embryos can only be disposed of through implantation, not intentional destruction or through destructive human embryo research. b) Embryos must not be subjected to non-therapeutic experimentation.

If we believe that human life deserves dignity and respect, then our failure to allow these embryos to die naturally would be medically irresponsible and ethically objectionable, from the Catholic perspective.

5. References

- [1] National Center for Health Statistics, “Infertility,” October 31, 2007.
<http://www.cdc.gov/nchs/fastats/fertile.htm>.
- [2] Center for Disease Control and Prevention, “Assisted Reproductive Technology,” June 2008. [Http://www.cdc.gov/ART/](http://www.cdc.gov/ART/)
- [3] Rand Law and Health/Society of Assisted Reproductive Technology (SART) Working Group, “How Many Frozen Human Embryos Are Available For Research?” May 2003. http://www.rand.org/pubs/research_briefs/RB9038/index1.html.
- [4] Papanikolaou EG, Camus M, Kolibianakis EM, Van Landuyt L, Van Steirteghem A, Devroey P. “In Vitro Fertilization with Single Blastocyst-Stage versus Single Cleavage-Stage Embryos.” *New England Journal of Medicine* 354 (March 16, 2006): 1139-1146.
- [5] Lysaught, Therese. “Embryo Adoption?” *Human Life Review* (2003): 1-4.
http://findarticles.com/p/articles/mi_qa3798/is_200310/ai_n9297175/print.
- [6] Collins, Timothy. “On Abandoned Embryos,” *The Linacre Quarterly* 75 (1) (February 2008): 1-15.
- [7] Congregation for the Doctrine of the Faith, Instruction *Dignitas Personae* on Certain Bioethical Questions, (September 8, 2008): 1-23, at Section 2, #18.
- [8] Pence, Gregory. *Medical Ethics*, 5th edition (Boston, MA.: McGraw Hill, 2008): 100.
- [9] Ryan, Caroline. “More Than 3 Million Babies Born From IVF,” *BBC News* (June 21, 2006): 1-3. <http://news.bbc.co.uk/1/hi/health/5101684.stm>.

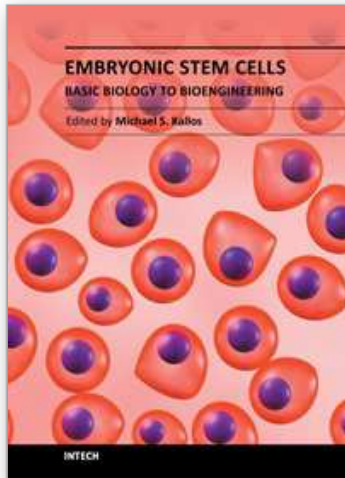
- [10] Medical Encyclopedia, "In-Vitro Fertilization," *Medline Plus*, (January 31, 2007): 1-4. <http://0-www.nlm.nih.gov.catalog.llu.edu/medlineplus/ency/article/007279.htm>
- [11] Scott, J.R. et al. *Danforth's Obstetrics and Gynecology, 9th edition*, (Philadelphia, PA.: Lippincott, Williams & Wilkins, 2003), Ch. 39 "Assisted Reproductive Technology, p.709.
- [12] Centers for Disease Control, Department of Health and Human Services, *2003 Assisted Reproductive Technology Report*, (2004). <http://www.cdc.gov/ART/ART2003/index.html>. See 2003 National Summary Table.
- [13] Collins, 3.
- [14] Pence, 102.
- [15] Tarkan, Laurie. "Lowering Odds of Multiple Births," *The New York Times* (February 19, 2008): 1-4. [Http://www.nytimes.com/2008/02/19/healthy/19mult.html](http://www.nytimes.com/2008/02/19/healthy/19mult.html).
- [16] Collins, 4.
- [17] Collins, 4.
- [18] Emory Reproductive Center, "Cryopreservation," Emory Health Care, 2008. http://www.emoryhealthcare.org/departments/ivf/services/cryo_preservation.html
- [19] Collins, 5. Hoffman, D., Zellman, G., Fair, C. et al. "Cryopreserved Embryos in the United States and their Availability for Research," *Fertility and Sterility* 79 (5) (May 2003): 1063-1069.
- [20] Embryo morphology (appearance of the cells/percentage of fragmentation) is one of the most influential factors for embryo survival. Genetics & IVF Institute, "Human Embryo Cryopreservation (Embryo Freezing) and Frozen Embryo Transfer Cycles," (2008): 1-2. <http://www.givf.com/fertility/embryofreezing.cfm>
- [21] Genetics & IVF Institute, 2.
- [22] RAND/SART Working Group, 1.
- [23] RAND/SART Working Group, 1.
- [24] RAND/SART Working Group, 1-2.
- [25] Kass, Leon. *Life, Liberty and the Defense of Dignity: The Challenge for Bioethics* (San Francisco: Encounter Books, 2002): 87.
- [26] Moore, K, & Persaud, T.V.N. *The Developing Human: Clinically Oriented Embryology* (Philadelphia: Saunders/Elsevier, 2008): 15.
- [27] Holy See, *Charter of the Rights of the Family*, no. 4: *L'Osservatore Romano*, November 25, 1983.
- [28] Congregation for the Doctrine of the Faith, *Donum Vitae – Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation – Replies to Certain Questions of the Day*, (Rome: Congregation for the Doctrine of the Faith, February 22, 1987): 1-29. <http://www.priestsforlife.org/magisterium/donumvitae.htm>
- [29] Brugger, E. C. "The Principle of Fairness and the Problem of Abandoned Embryos," Panel Discussion at the Conference on Emerging Issues in Embryo Donation and Adoption, (Washington, D.C.: May 30, 2008): 1-6.
- [30] Lysaught, 3.
- [31] Congregation for the Doctrine of the Faith, *Dignitas Personae* Section 2, No. 19.

- [32] Atkinson, G. Theological history of Catholic teaching on prolonging life, in D. McCarthy and A. Moraczewski, eds., *Moral Responsibility In Prolonging Life Decision* St. Louis: Pope John Center, 1981.
- [33] Aquinas, Thomas. (1966). *Summa Theologica* eds. Anthony Ross and PG Walsh, Blackfriars edition New York: McGraw-Hill, II, II, q. 126, a.1 and ad.3; on suicide: II, II, q. 64, a5; On Killing the Innocent: II, II, q. 64, a. 6; On Self-Defense: II, II, q. 64, a. 7 and 8; On Mutilation: II, II, q. 65, a.1
- [34] The *Relectio* was a lecture that De Victoria, the preeminent theologian at the University of Salamanca, Spain, would give at the beginning of each school year. These lectures treated some difficult, contemporary dilemma. One can presume that the question of prolonging life must have been a disputed topic at the time. De Vitoria, F. *Relectiones Theologicae* (Lugdini, 1957): Relectio IX, de Temp., n.12. See also Sparks, Richard. *To Treat or Not To Treat*. New York: Paulist Press, 1988): 94-95.
- [35] Sparks, 95-96.
- [36] Sparks, 95.
- [37] Sparks, 96.
- [38] Soto, Domingo. *De Justitia et Jure*. (Venice, Italy, 1568): Lib. 5, question 2, article 1; See also Sparks, 96.
- [39] Wildes, Kevin. "Ordinary And Extraordinary Means and The Quality Of Life," *Theological Studies* 57 (1996): 500-512 at 504.
- [40] Bañez, Domingo. *Scholastica Commentaria in Partem Angelici Doctoris S. Thomae* Tom. IV, "Decisiones de Jure et Justitia," (1614-15): II, Ilae, Question 65, Article, 1. Duaci.
- [41] Paris, J. and McCormick, R. The Catholic Tradition on the Use of Nutrition and Fluids. *America* 156, (1987): 356-361.
- [42] De Lugo, Juan. "Disputationum de justitia et jure" (Lyons, 1642): 10, section 1, n. 9 De Justitia et Jure.
- [43] Kelly, G. "The Duty of Using Artificial Means of Preserving Life," *Theological Studies* 11, (1950): 203-220.
- [44] Kelly, 210.
- [45] Cronin, D. "The Moral Law in Regard to Ordinary and Extraordinary Means of Conserving Life," (Gregorian, Rome, 1958); See also, Paris and McCormick, 360.
- [46] Pius XII. "Prolongation of Life," *The Pope Speaks* 4, (1958): 395-396.
- [47] Wildes, 512.
- [48] Pius XII. "Cancer: A Medical and Social Problem," *The Pope Speaks* 3, (1957): 48.
- [49] Wildes, 508.
- [50] Congregation for the Doctrine of the Faith. "Declaration on Euthanasia," part 4, *Origins* 10, (1980): 154-157.
- [51] Congregation for the Doctrine of the Faith, "Declaration on Euthanasia," 156.
- [52] Congregation for the Doctrine of the Faith, "Declaration on Euthanasia," 156.
- [53] Congregation for the Doctrine of the Faith, "Declaration on Euthanasia," 157.
- [54] Wildes, 512.
- [55] John Paul II. "Evangelium Vitae," no. 65. *Origins* 24, (1995): 687-727 at 62-63.
- [56] John Paul II. "Evangelium Vitae," no. 65, at 62-63.

- [57] Shannon, T. and Walter, J. "Artificial Nutrition & Hydration: Assessing Papal Statement," *National Catholic Reporter* (2004): 1-4.
http://www.natcath.com/NCR_online/archives2/2004b/041604/041604i.php

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